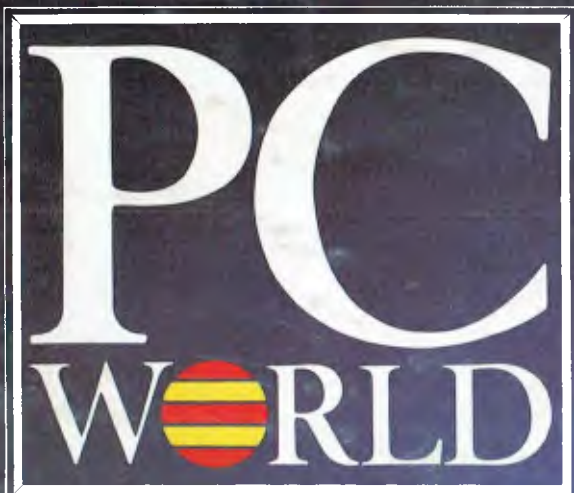


Australian



About IBM PCs and compatibles

AUGUST 1984
\$3.00*

SYMPHONY

in Business Software
-FIRST USER REPORTS

WORDPERFECT
-A GREAT WORD
PROCESSOR

GETTING
STARTED
WITH DOS

NEW TOOL FOR
PERSONNEL
MANAGEMENT

HARDWARE REVIEWS

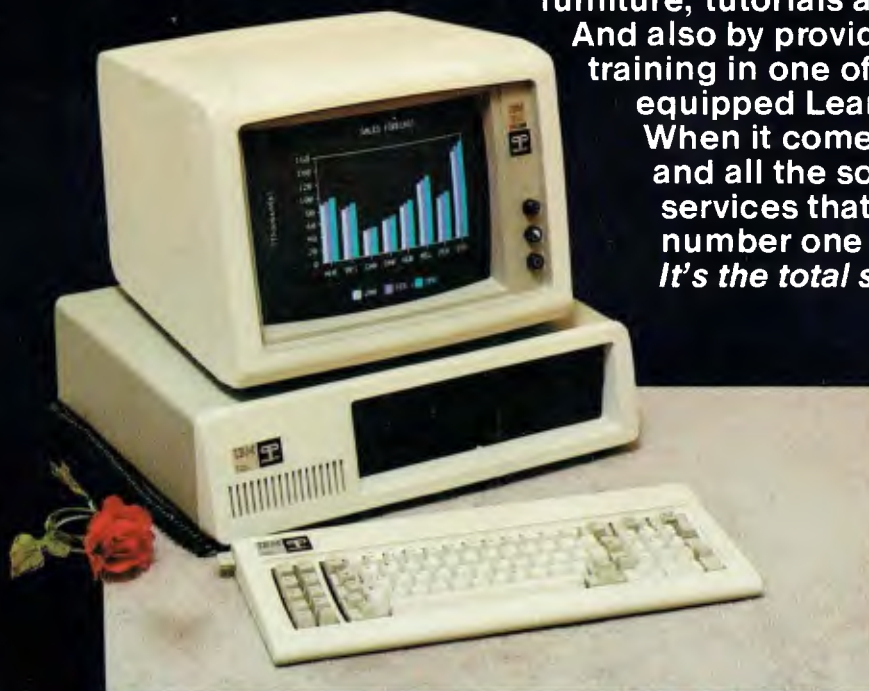
Sanyo MBC-550 Dick Smith's PC-Compatible

WIN THE WORLD CLASS PC
SOFTWARE COLLECTION
DETAILS PAGE 103

PARITY does much more for you

By evaluating software before we'll recommend it. By not just delivering an IBM PC then walking away from it but making sure it's installed and working properly. By providing everything you could need to make it work even better . . . printers, plotters, cables, modems, colour monitors, expansion boards, diskettes, furniture, tutorials and so on.

And also by providing hands-on training in one of our fully equipped Learning Centres. When it comes to the IBM PC and all the software and services that support it, the number one name is Parity. *It's the total service.*



PP
PARITY

Australia's No.1



PRINTERS



SOFTWARE



PORTABLES



PLOTTERS



TRAINING



MAINTENANCE

SYDNEY: 472 Pacific Highway, St Leonards, NSW 2065
Telephone: (02) 438 3222

MELBOURNE: 424 St Kilda Road, Melbourne, VIC. 3004
Telephone: (03) 267 6844

CANBERRA: 2 Lyell Street, Fyshwick, ACT 2609
Telephone: (062) 80 6444

BRISBANE: 159 Coronation Drive, Milton, QLD 4064
Telephone: (07) 229 2216

IBM PC USERS

Now you can process your Mainframe data directly on your PC.

In fact you can now treat some of your company's mainframe resources as an extension of your PC. Tempus-Link gives you 4 additional PC disk drives which are actually located at the mainframe. You access these drives in exactly the same way you access your existing PC drives. Any PC program, including your favourite spreadsheet or database system, can read and write data to and from these mainframe disks. You can use PC/DOS COPY to move data between the mainframe disks and your present PC disks.

A mainframe task can move data between mainframe files and PC/DOS files located on

your Tempus-Link mainframe disk drives. If you are a TSO user you can use full screen SPF panels to select the files you wish to transfer.

Over 30 of Australia's largest companies have Tempus-Link PC users processing mainframe data on their PC's. They have found Tempus-Link to be the most cost effective way to get PC-users in touch with their mainframe data.

Tempus-Link will operate on all mainframes running MVS, DOS/VSE or VM/CMS. Ask your data processing department or Information Centre to make you a Tempus-Link user or contact us directly for some more information.



TEMPUS-LINK

DDP

DISTRIBUTED DATA PROCESSING PTY. LTD.

Level 29, 459 Collins Street, Melbourne 3000
Tel: (03) 62 4698



Editor Ian Webster
Associate Editor Ian Robinson
Technical Editor Neville J. Angove
Production Editor Denby Browning
Contributing Editors John Green
Ron Pollak

News/Feature Network Infoworld,
PC World, Micro Marketworld,
Computerworld

ADVERTISING

Group Manager Mike Williams
Co-ordinator Judith Seymour
NSW Sales John McGaulley,
Vic Sales David Clarkson,
Laurie Gross
Queensland George Hibbert
(07) 379 4424
Perth Winkie Corfield
(09) 384 5856
Adelaide Jim Stone
(08) 223 4631

CIRCULATION

Manager Shirley Ingram
Dorothy Adams

MARKETING/DISTRIBUTION

Manager Ken Beever

PRODUCTION

Manager Max Jaeger
Graphic Design Dean Shirley

Publisher Alan Power

ENQUIRIES & CONTACTS

Computerworld Pty Ltd, 37-43 Alexander Street, Crows Nest 2065, Australia. Tel: (02) 439 5133 Telex: COMWOR AA74752. Computerworld Pty Ltd, 74-76 Eastern Road, South Melbourne, 3205, Australia. Telephone: (03) 690 2933 Telex: COMWOR AA33926.

Australian PC World is published each month by Computerworld Pty Ltd, a company incorporated in NSW. It is available by annual subscription and through newsagents and selected computer retail stores. Reprinting of articles in *Australian PC World* is strictly forbidden without written permission. All rights reserved. Copyright 1984 by Computerworld Pty Ltd. Other publications published by Computerworld Pty Ltd include *Australian Micro Computerworld*; *Computerworld Australia*, The newsweekly for DP professionals; *On Communications*; directories *Greenbook of Software and Related Services*, *Redbook of Hardware and Related Services*.

Printed by Offset Alpine Printing Pty Ltd.
Silverwater, NSW.

Distributed nationally by Network Distribution Co.

* Recommended retail price only. Registered by Australia Post. Publication No. NBP 6683 — Category B.



About IBM PCs and compatibles

Readers will note that the masthead of this magazine has been changed. This has been done as part of a plan to create a *PC World* family which now comprises eight magazines around the world linked by an electronic mail system. This PC network is still growing with at least another two magazines to be added within six months.

IBM is the registered title and property of International Business Machines Corporation of Armonk, New York, USA and IBM Australia Ltd, 168 Kent St, Sydney. *Australian PC World* is not affiliated and has no connection with either International Business Machines Corporation or IBM Australia Ltd.

Cover Photography: Graeme Gillies.

GETTING STARTED

DOS for Beginners

A guided tour of the dominant DOS with David Arnold

8

BASIC Bricks and Mortar

Donald Trivette's handy hints on building programs

18

REVIEW

Dick's Plastic Challenge

Ian Robinson dares to compare a low-end compatible

26

A PC at Half the Price

Neville Angove finds the Sanyo makes an excellent small business system

30

Concurrent Widows: Two Views

A user finds too much glare in CCP/M-86 Windows but Bill Bolton has a different outlook

37

More Memory . . . and Multi-Tasking!

Add RAM — with a vengeance. Ian Robinson takes the latest memory board for a spin

48

HANDS ON

Symphony in Integrated Software

Harry Miller says he'd rather use Lotus 1-2-3

50

Conducting the Orchestra

A full-blast auditorium test of Symphony

58

An Australian Overture

This is a recording: Ron Pollak listens in on Symphony's local release

60

Perfect is Excellent

William Hall is rapt in WordPerfect word processing

62

C — The Developer's Solution

David Smith compared four of the best C compilers

70

COMMUNITY

Unmasking an Integrator

Les Stein looks at DBM II as Charles Watson gives a user's perspective

82

The Computerised Analyst

The PC turns industrial psychologist with a new Australian program. Ian Robinson reports

89

Looking into Tempus-Link

The best of both PC and mainframe worlds?

93

PC News Network

Dumb LANs

IBM Promotes Science

Price Cuts for Market Share

MicroPro Launches Updates

IBM Watch

96

Dealer Profile

105

In the Public Domain *PC and Lotus user group activity*

106

★ ★ Star-Dot-Star *Users' patches and suggestions*

107

DEPARTMENTS

PC Hotline

4

Industry

115

Peripherals

115

Software

118

Systems

119

PC HOTLINE

PC upgrades cause confusion. Several weeks ago, "PCI" was a mysterious line on IBM dealer statements in the US. But now several analysts agree that it is a replacement for the PC that will be released in August with first US sales in October.

PCI is an upgrade to the existing PC, according to Ken Lim of Dataquest. It will be based on the new, faster Intel 8088-2 processor, running at 8MHz. Lim expects the new system will be introduced along with IBM's own windowing software, code-named Glass.

IBM has caused further confusion over a possible PC replacement by releasing to some software houses a PC development system that is based on the Intel 80286 processor. The system will operate under IBM's own multi-tasking PC-DOS Version 3. This system has also been claimed to be the mysterious PCI.

A third unannounced release by IBM is causing still more confusion. Not long after IBM announced it was shipping PCs with a new motherboard some dealers have discovered that the latest shipment of XT's are using the portable PC motherboard, distinguished by a lack of data lines to the last expansion socket.

IBM cuts, but others bleed. IBM's price cuts on the PC and planned introduction of a new microcomputer will push some PC-compatible makers out of the market, according to industry executives and analysts. IBM's plans have already forced several manufacturers to cut prices.

"It's hard times for clone makers," said David Kay, vice-president of Kaypro Computer Corp. "It's going to be a long hot summer." Kay said the price cuts and the new PC make the clones "obsolete".

Smaller companies trying to compete on price alone will be the hardest hit, analysts said. Manufacturers recently introducing new IBM-compatible machines will also face incredible pressure, they said. "It's going to be hard for a lot of companies that don't have financial stability," one industry executive said.

Companies that announced price cuts after IBM's

Price cuts for Eagle computers, including the portable Spirit, follow cuts by IBM.



announcement include Eagle, Columbia, Corona, Leading Edge and Tava. Leading Edge and Corona officials maintained the price cuts were planned or implemented before the IBM announcement.

Tava, a small company that introduced an IBM-compatible machine last November, has cut the price of its complete system 20 per cent.

Leading Edge cut the price of its personal computer about 7 per cent 10 days before the IBM announcement, according to William Sellers, vice-president of market research for the company. Leading Edge, however, announced the cut one day after the IBM announcement.

Columbia Data Products said it would cut prices to keep its computers priced 10 per cent lower than the PC line. "There will be a shakeout and people will get caught," said Richard Gralton, president of Columbia. "The move made by IBM as the leader is significant and will have an impact on a lot of people. We think we can play that game."

The price cuts will "accelerate" a shakeout of IBM-compatible manufacturers, said David Gardner, president of Seequa Computer Corp, which introduced an IBM-compatible desktop computer in May. "There really is room for only three to five compatible manufacturers when the dust settles."

Gardner said his company's computer line, without free-bundled software, is \$US300 to \$US800 less than IBM's products. "There is still a comfortable margin," he said. "But if they had a similar price cut soon they'd be right on top of us." Seequa began shipping its first PC-compatible product in March 1983.

IBM may be trying to pressure compatible makers and other manufacturers, said Aaron Goldberg, an analyst for International Data Corp, a US market research company. Dr Larry Lotito, vice-president of marketing and strategic planning for Corona, said the company informed distributors of a price cut last month. Lotito said prices on most Corona computers will be reduced to maintain a "10- to 20 per cent" price differential.

"Weaker companies will get forced out of the market," Lotito said. "And some of those entering will think twice. It's an aggressive marketplace. You have to have established distribution and recognise that prices are going to come tumbling down 20 per cent a year no matter what you do."

Quadram network links PCs. Quadram Corp has introduced Quadnet, a line of three local-area network configurations designed to connect PCs so users can share data, programs and expensive peripherals.

Quadnet II connects a maximum of 32 PCs by twisted-pair cable that serves as a bus between various



IMAGINEERINGTM

"The Art of Software"

presents

THE TIME SPECTRUMTM

**"ADD UP TO 512K RAM, ASYNC AND
SYNC COMMUNICATIONS, A CLOCK
AND PRINTER SUPPORT-UP TO FOUR
I/O PORTS IN JUST ONE SLOT."**



PERSYSTTM

**Available for the IBM PC & XT at all fine microcomputer outlets
IMAGINEERING, 579 HARRIS STREET, ULTIMO, N.S.W. 2007. TELEPHONE: (02) 212 1411**

PC HOTLINE

stations, Quadram said. A master station reportedly polls each microcomputer to determine if it wishes to send or receive data, and the master station then transfers data at a speed of 30K-bits/sec.

Quadnet VI, which uses a baseband coaxial cable, reportedly can transfer data at a speed of 2M-bytes/sec and a distance of about 2km. It uses carrier-sense multiple access with collision detection to ensure clear, high-speed data transfer, according to Quadram.

Quadnet IX supports 255 users, uses a token-passing protocol and transmits data at a speed of 10M-bytes/sec, Quadram says.

IBM unwraps DisplayWrite. IBM's Entry Systems Division has introduced the DisplayWrite Series of text processing programs similar to those used on the Displaywriter. Documents prepared using DisplayWrite 1, a word processing program for the PC, PCjr, PC XT, and Portable PC, can be revised on other systems.

This menu-driven, multi-functional program uses ASCII data representation and can exchange diskettes with the PC, allowing documents to be created, modified, or printed on different systems in the home or office.

DisplayWrite 2, a word processing program for the PC, PC XT, Portable PC, and 3270-PC, has a built-in spelling aid of about 100,000 words. Similar to the Displaywriter System Texpack 4, the program allows data from printable DOS/ASCII files to be merged interactively with text documents. It provides Revisable-Form-Text Document Content Architecture support.

Wang emulates PC. Wang Laboratories has announced two products that it said "make the PC coexist with the Wang Professional Computer".

The company unveiled the Wang/IBM Emulation Control Board, which reportedly emulates the PC monochrome card and permits the Wang Professional to accept off-the-shelf PC software that runs in monochrome text mode, according to the spokesman for the company.

"Most popular programs will run without modification," typically operating twice as fast as on the PC, said Ken Sullivan, director for Professional Computer product marketing at Wang. The product, with associated software and key caps, will be available in September.

The second product announced was a Wang System Network option for the PC. It provides the company's customers who have PCs with a way to get into Wang environments. The lack of such access "has become a significant problem," Sullivan said.

The option, with a communications board and

associated software, allows PCs to connect to Wang VS systems and participate in Wang networking. The IBM system can either attach as a VS data processing workstation or transfer files to and from the VS, with files downloaded by a VS print facility, Wang said.

As well as those two products, Wang has announced a 30M-byte hard disk drive for the Professional and the PIC, the Professional Image Computer.

IBM touts graphics of 3270 advanced versions.

Two advanced versions of the IBM 3270 Personal Computer offer many of the sophisticated graphic functions of large host computers, according to IBM Corp.

The new IBM 3270 PC/G and PC/GX give users desktop functions to change graphics, zoom in on details, or create drawings. The systems can display charts, diagrams, or drawings in multiple windows and print them on a new desktop ink-jet printer using a workstation control program and enhanced programs on the host computer.

The PC/G and PC/GX have graphics processing units that enable them to receive picture data from host computers in shorthand vector form, the firm said. They can also manipulate a picture locally, without going back to the host computer.

New and enhanced graphics programs were also introduced, as well as 11 drawing and printing devices that can be attached directly to the workstations:

- An enhanced host-based graphics program, Graphical Data Display Manager, that produces 3-D charts.
- A workstation graphics control program that enables the new units to handle host graphics sessions and support PC graphics applications.
- A seven-color ink-jet printer — the IBM 3852.
- An optical mouse.
- A tablet with cursor for digitising drawings.

The 3270-PC/G has a 14-inch, 8-color display with 720-by-512 user-addressable points. The PC/GX color and monochrome workstations have higher performance and screen resolution and more advanced graphic functions, the vendor said, including the capability of creating and rotating 3-D pictures at the workstation.

The 19-inch GX display has 960 x 1000 addressable points.

The workstations may be used as standalone personal computers, IBM noted. The workstations can be connected to any IBM Systems/370 via a 3274 control unit.

Price for a minimum configuration 3270-PC/G totals \$US9535, which includes a Model 12 system unit with 384K-bytes of memory, color display, display attachment unit, keyboard, and graphics control program.

A similar configuration of the PC/GX is priced at \$US16,785.

The 16 bit IBM Compatible for near half the price!



More computer for nearly half the price!

If you're really serious about computing, you're probably looking at the IBM PC. It's a superb computer – but look at the price; way over \$5,000 for a usable system, then you start buying the programs! Now there's a brilliant, compatible alternative: the Dick Smith Challenger. For near half the price of an IBM PC, it gives you much more computer. With Challenger you get 128K bytes of RAM memory, for example – not just 64K. And on the expanded machine you also get both Centronics and RS-232C Serial Ports as standard (IBM charges you extra for both).

An IBM PC expanded to this level would cost you over \$5,300*, yet the expanded Challenger costs only \$2990.

Is it really IBM compatible?

Compatibility is a tricky business: some software made for the IBM PC won't even work on certain configurations of the PC itself. A few odd programs rely specifically on minor internal details of the IBM PC which cannot be duplicated legally on other machines.

The Challenger is about as compatible with the IBM as you can get. This means it can run just about all of the huge range of software written for the PC – just pop in the disk, load and go!

Plus software worth over \$800 – FREE!!!

That's right – with the Challenger Expansion Unit, we give you a set of software and manuals worth over EIGHT HUNDRED DOLLARS, absolutely FREE! With the IBM PC, it's all optional at extra cost! It's all the software you're likely to need for most home and office computing: MICROSOFT MS-DOS, GW DISK, BASIC, PERFECT WRITER/SPELLER, PERFECT FILER & PERFECT CALC.

Leasing, commercial finance or Bankcard are all available to approved customers.

Challenger is the registered trademark of Dick Smith Electronics.

Challenger total system \$2990

CHALLENGER®

*Prices correct as at 21.6.84

Dick Smith Electronics

COMPUTER CITY

in 46 Dick Smith Electronics stores
throughout Australasia

Get
your
FREE
Challenger
Information
Pack.

Name _____

Address _____

Phone _____

Would you use the Challenger for:

☐ Business ☐ Education ☐ Fun ☐ Other

Post to: Dick Smith Electronics, PO Box 321, North Ryde, NSW 2113 or call in to your nearest Dick Smith Computer City Centre.

DOS for Beginners

The power of
PC-DOS lies
in its
utilities —
David Arnold
shows how to
best exploit
them.

PC-DOS is the disk operating system sold most often with the PC and XT. It is generally compatible with MS-DOS, which runs on many computers similar to the PC.

Several other operating systems are available for the PC, including CP/M-86, Concurrent CP/M-86, the p-System, and various forms of Unix. Yet PC-DOS is by far the dominant operating system.

DOS (disk operating system) is a collection of utilities that manage data in the computer system. More than 40 commands are available, many of which call up complete programs that have their own sets of commands, including EDLIN, DEBUG, and LINK. These more complex DOS features are intended for programmers or advanced users.

The most frequently used DOS commands make backup copies of disks and files, display the contents of a file on the screen, indicate the amount of space available on disk or in memory, and erase and rename files. Although this article focuses on DOS 2.00, the basic commands are essentially identical to those found in DOS 1.00, 1.10 and 2.10.

Some DOS functions are essential: you can't run an applications program without them. The essential parts of DOS reside on almost every disk you'll use with the PC. Two of these three basic DOS files, IBMBIO.COM and IBMDOS.COM, are transparent (hidden) and not listed in the directory. The third essential file is a nontransparent utility called COM-MAND.COM. These three files are sent into RAM every time you load DOS (by turning the power switch on or by resetting the computer with a DOS system disk in drive A: [see Figure 1]).

Most applications programs make DOS as transparent as possible. They do this by using their own menus or commands to activate DOS. Consequently, most PC users can run their computers without having to learn much about DOS.

Why should you learn how to use DOS if your applications programs do everything for you? That is like asking why you should learn to set the shutter speed and lens opening on your camera when you could set it on automatic. For average pictures in average situations, automatic operation is sufficient, but to get the best results, maximise control and flexibility, and be able to handle unexpected problems, you have to assume control at the source.

Understanding DOS

When the computer loads a program, it copies the program from the floppy disk into memory (RAM) so you can use it. DOS never removes the original file from the disk unless you delete a file with the ERASE or DEL command.

When you load a program from drive A by simply turning the computer on, the computer normally loads DOS at the same time but might keep it transparent, not even displaying the DOS A> prompt. Many programs display their own prompt, such as 'Ok' (BASIC), '*' (EDLIN), '.' (DEBUG), or a flashing cursor (most word processing programs). Regardless of whether you can see evidence of its presence, DOS is always there.

It would waste space to keep all of DOS in main memory (RAM), so when you load DOS, only the most frequently used DOS functions go

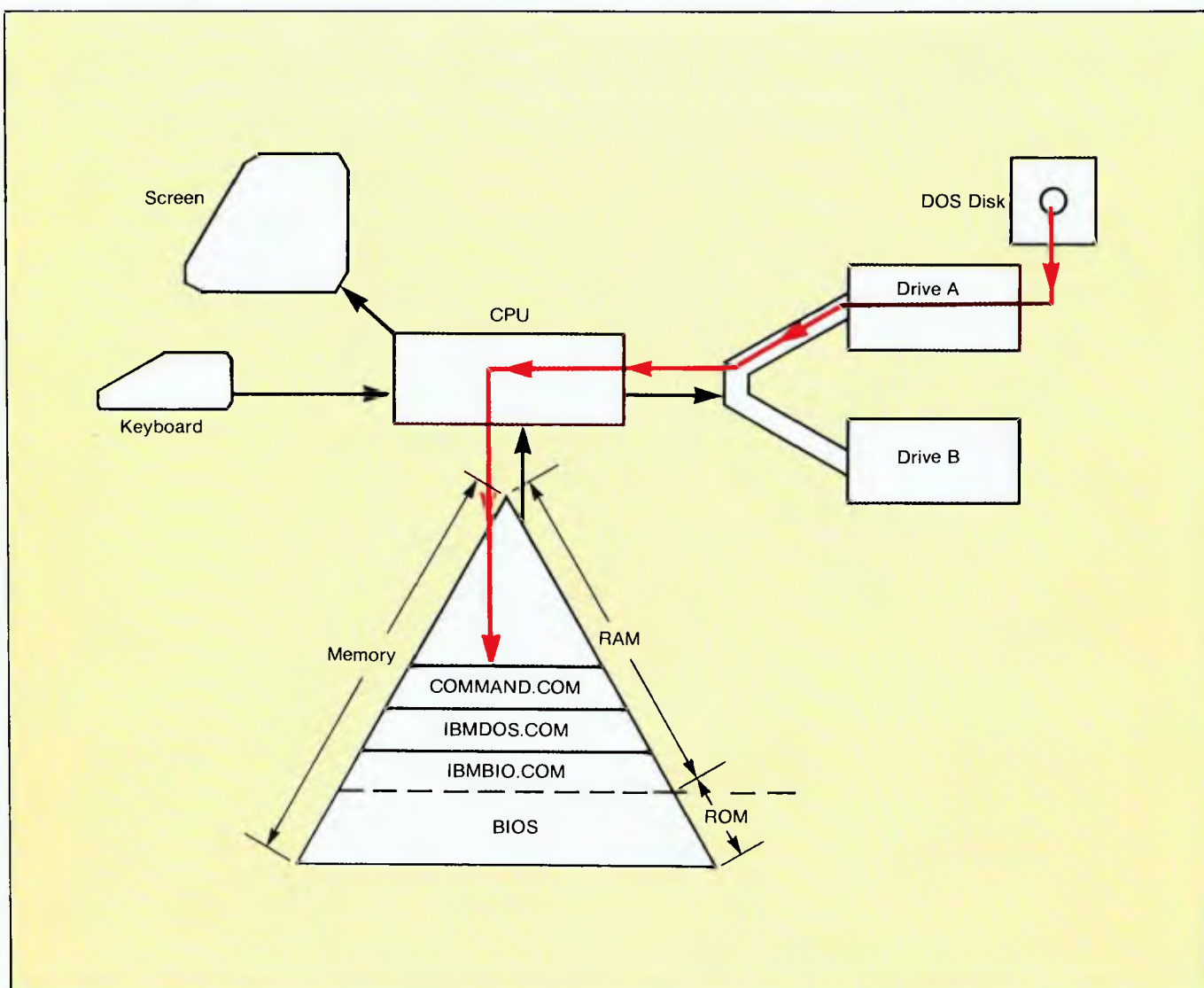


Figure 1: **COMMAND.COM** and the two hidden **DOS** files that are loaded into **RAM**.

into memory. When you type a more complex command, such as **FORMAT**, DOS has to go back to the disk for it. Thus, you must have a system disk (either the DOS distribution disk or another disk with a copy of the DOS system on it) in the disk drive to run DOS. The parts of DOS that reside in memory are called "internal commands"; those that reside on disk and are copied into memory while they are being used are called "external commands".

Once you have loaded DOS, you can remove the system disk and all the internal commands will still be

accessible. External commands, however, can only be used if the disk you are using contains the file that executes the desired command. Figure 2 is a list of the internal and external commands covered in this article.

File specification

While some DOS utilities, such as **FORMAT**, work on the disk as a whole, most DOS commands operate on individual files. A disk is the equivalent of a file drawer; the mass of information on a disk or in a file drawer is organised into files,

and each file is labelled with a name.

File folders have a tab, and disk files have a file specification, or filespec. DOS serves as the file clerk. Just as a file clerk might take a file from a drawer, make a photocopy, and put in on your desk, DOS goes to the disk, makes a copy of the file you want, and puts the copy in memory so you can work on it.

The first part of the filespec is called the file name; the second part is called the extension. The file name can be from one to eight characters long. The extension can be from one to three characters

INTERNAL

Command	Function
DIR	Lists directory of disk
COPY	Copies file(s)
ERASE	Deletes file(s)
DEL	Deletes file(s)
CLS	Clears screen
REN	Renames file

EXTERNAL

Command	File needed on disk	Function
FORMAT	FORMAT.COM	Formats a disk for use and erases contents
DISKCOPY	DISKCOPY.COM	Copies entire disk and erases contents
DISKCOMP	DISKCOMP.COM	Compares contents of two disks
COMP	COMP.COM	Compares contents of two files
CHKDSK	CHKDSK.COM	Checks disk and displays contents in bytes

Figure 2: Commonly used internal and external DOS commands.

long and is always separated from the file name by a period. Filespecs can contain almost any combination of letters and numbers as well as certain punctuation marks.

DOS will let you know if you try to create a file name with unacceptable characters; a message such as 'Invalid number of parameters' or 'Bad command or file name' will appear on the screen.

You don't have to use extensions, but they are useful in organising groups of files and can provide information about a file's contents. Some extensions have a standard meaning: .BAS signifies a program written in Basic; .Com and .EXE are used for program files; and .BAT indicates a batch file, which is a series of commands that DOS executes sequentially. You can also make up your own extensions, such as .TXT to designate a file containing text rather than a program, .LET for letters, or .614 for a file created on June 14.

Default Drives

To start using DOS commands, place a system disk in drive A and turn on the power switch or, if the power is already on, reset (boot up) the computer by pressing <Ctrl> <Alt> . The system first asks for the date. If dating your material is important, type the month, day, and year divided by either slashes or hyphens. For example, for April 23, 1984, you would type

04/23/84 (Enter).

Then the system asks for the time in a 24-hour format. For example, for 9:45am, you would type

9:45 (Enter).

For 9:45pm, you would add 12 hours and type

21:45 (Enter).

If dating and timing your files is

unimportant, simply press <Enter> twice, and you will see an A> prompt appear on the screen. This means DOS is waiting for instructions.

The A> prompt indicates that you will be issuing a command from the A (left) drive. This is the default disk drive. For most systems, A will always be the default disk drive. However, if you have an XT or a hard disk and no program disk is inserted in the A drive, the default drive will be C.

To temporarily change the drive you are working on, type the letter of the drive followed by a colon and press <Enter>. If the command you issue effects only a file or files on the disk in the default drive indicated by the prompt, no further drive specification is necessary. However, if one or more of the files affected are found on a drive other than the one indicated by the prompt, each remote file must be preceded by the appropriate drive

A>dir/w

Volume in drive A has no label

Directory of A:\

COMMAND	COM	EXE2BIN	EXE	LINK	EXE	DEBUG	COM	ART	BAS
SAMPLES	BAS	MORTGAGE	BAS	COLORBAR	BAS	MUSIC	BAS	DONKEY	BAS
CIRCLE	BAS	PIECHART	BAS	SPACE	BAS	BALL	BAS	COMM	BAS
ANSI	SYS	FORMAT	COM	CHKDSK	COM	SYS	COM	DISKCOPY	COM
DISKCOMP	COM	COMP	COM	EDLIN	COM	MODE	COM	FDISK	COM
BACKUP	COM	RESTORE	COM	PRINT	COM	RECOVER	COM	ASSIGN	COM
TREE	COM	GRAPHICS	COM	SORT	EXE	FIND	EXE	MORE	COM
BASIC	COM	BASICA	COM	CA1	BAS	NEWDSK	BAK	NEWDSK	BAT
DISCCOPY	COM	DISCCOMP	COM	CPQBASIC	EXE				

43 File(s) 46080 bytes free

A>

Figure 3: DIR (directory) command with /W option.

letter and colon.

You can use the directory (DIR) command to get a list of the files contained on a disk. To check the directory of the disk in the current default drive, type DIR in uppercase or lowercase letters and press (Enter).

The directory provides (from left to right) the file name, the extension, the size of the file in bytes, and the date and time each file was last updated. At the bottom of the list the number of files and the amount of unused space on the disk are displayed.

Some disks have so many files that the list is too long to fit on the screen. In that case the top lines scroll out of sight. There are two ways to read a directory too large for the screen. One is to add /P (for pause) to your request:

DIR/P (Enter)

This command tells DOS to scroll the first part of the file list into view and then pause. Press any key, and the rest of the display scrolls onto the screen.

You can display the directory in another screen format by adding /W (for wide) to your request:

DIR/W (Enter)

This time, instead of a single column, the directory displays the file names five across but doesn't provide additional information on file size, dates, and times (see Figure 3).

Although the directories of most disks you use will probably fit on one screen, on some disks a directory might take up two or three full screens. With the XT or another hard disk system, one directory can contain up to 512 file names.

Format

Before you save any data on a disk, the disk must be formatted by DOS. When you format a disk, you erase any information that's stored on it.

Therefore, you must be extremely careful to designate the correct disk drive when using the FORMAT command. Always check that you've given a drive designation (A, B, and so on) and that the disk you want to format is in that drive.

To be sure that you don't mistakenly erase data by formatting, run a directory (most likely DIR B:). If the disk has not been formatted, a disk error message will appear.

If you have an XT, you must be especially careful when you use the FORMAT command because it could erase and reformat the hard

disk as well as the floppy disks. The hard disk on the XT is designated as drive C (although you can change this to another letter). If you do not include a drive letter in the FORMAT command, drive C will be assumed, and you will erase all data on the hard disk. If you designate drive A or B, the hard disk data will be safe.

The directory provides the file name, the extension, the size of the file in bytes, and the date and time each file was last updated.

To format a disk, leave a disk containing the FORMAT.COM program file in drive A and put a blank disk in drive B. From the A> prompt, type

FORMAT B:/S (Enter).

This command directs DOS to format the disk in drive B and put a copy of the operating system (/S) on the disk at the same time. The system consists of the DOS files IBMBIO.COM, IBMDOS.COM, and COMMAND.COM. The computer will respond with 'Insert new diskette for drive B and strike any key when ready'.

Since you already have a new disk in drive B, press any key (or insert a blank disk if you're using a single-drive system). Drive B (the one on the right side) will start whirring, its red indicator light will glow, and the screen will announce 'Formatting 9 sectors per track, 2 sides . . . '.

Since you can't see the formatting process in action, visualise a large roll of paper, 8½in wide by hundreds of feet long. Imagine cutting it into pieces 11in long and putting lines and page numbers on each sheet. That procedure would be the nonelectronic equivalent of formatting a disk.

DOS 2.00 creates 40 concentric tracks on each side of a disk. At the same time, it does the electronic

or 368,640 a disk if you have double-sided disk drives. Since 1K-byte is 1024 bytes, that works out to 360K-bytes of storage space. A double-sided disk formatted under DOS 1.10 has a capacity of 327,680 bytes, or 320K-bytes.

DOS 2.00 can read eight-sector and nine-sector disks with equal ease. But DOS 1.10 can read only eight-sector disks, so you cannot read disks formatted with DOS 2.00 when you are using DOS 1.10.

Once the computer has finished formatting the disk and transferring the operating system, the FORMAT program will ask 'Format another? (Y/N)?' Press **N** to get back to the **A>** prompt.

CHKDSK

To check if FORMAT has done its job and to ensure that a disk is in good shape you can use the CHKDSK command. CHKDSK, pronounced "check disk", does just what its name implies; it checks a disk and reports in more detail than DIR how much space is available for storing programs or data.

To check the disk you have just formatted, type

CHKDSK B: <Enter>.

If you're using DOS 2.00 with double-sided disk drives, the screen should look like Figure 4. CHKDSK lists total disk space, hidden files, user files (in this case only COMMAND.COM), and bytes available on the disk. The last number in Figure 4 is the reason most people use CHKDSK — to see how much space is left on the disk.

The last two lines, separated from the others by a blank line, show the total main memory (RAM) in the computer (131,072 means 128K-bytes of RAM) and the number of bytes free. Subtract bytes free from total memory and you discover how much memory is currently in use.

Occasionally, a disk will have a bad sector. When you use the FORMAT command, DOS tests the disk for bad sectors; if it finds any, it marks them off so that no data can

be stored on them. If any bad sectors have been found, CHKDSK will report them.

COPY

The COPY command is one of the most useful internal commands that DOS provides. It enables you to copy an individual file or a group of files from one disk to another.

A>chkdsk b:

362496 bytes total disk space
22528 bytes in 2 hidden files
18432 bytes in 1 user files
321536 bytes available on disk

262144 bytes total memory
237568 bytes free

A>

Figure 4: CHKDSK on a blank formatted double-sided disk.

As an example you can copy files from the DOS distribution disk in drive A to the newly formatted disk in drive B by typing

COPY A:FORMAT.COM B:FORMAT.COM <Enter>.

When you see the message '1 File(s) copied' followed by the **A>** prompt, you know the file has been copied. To verify, type

DIR B: <Enter> ,

and you will see **FORMAT.COM** listed on drive B. Now type

DIR A: <Enter> ,

and you can see that **FORMAT.COM** is still on drive A as well as being on drive B.

Typing the drive designations before the filespec is not always necessary. If the file to be copied is

Visualise a large roll of paper. Imagine cutting it into pieces and putting lines and page numbers on each sheet.

equivalent of drawing lines from the centre to the edge, dividing each track into nine sectors (DOS 1.10 and 1.00 create eight sectors).

This creates a total of 360 sectors on each side of the disk, each of which can hold 512 bytes (characters) of information. That's a grand total of 184,320 bytes a side,

NEW...

PERSONAL COMPUTER TRAINING CENTRE

561 Bourke Street (near William Street)



Every class member has a fully-configured IBM PC, video networked to allow students to see a copy of the instructor's screen.

Our scheduled courses include:

- Introduction to Personal Computers and their uses
- Lotus 1.2.3 / Symphony... intro. and advanced
- Local Area Networks ● dBase II ● Word Processing

The Training Centre is also available for hire if you have your own course.

Enquiries welcome **614 1433**.



B. S. MICROCOMP PTY. LTD.,
561 BOURKE ST., MELBOURNE 3000.

To: B. S. MICROCOMP PTY. LTD., 561 BOURKE ST., MELBOURNE 3000.
I'm interested. Please send me, with no obligation, information
on your Training Centre and courses. I'm specially
interested in _____
Name _____
Company _____
Address _____

ALM/MSD

on the same drive as the prompt displayed, the designation is not necessary. If the name of the file to be copied is to remain the same, a further shortcut can be taken by not repeating the filespec. You can type

COPY FORMAT.COM B:

The COPY command can also be used to rename a file as it is being copied. If you want the new file to be called DESIGN.COM on drive B, type

COPY FORMAT.COM B:DESIGN.COM.

What if you shorten the command still further by leaving off B, as in

COPY FORMAT.COM?

DOS will again default to the A: drive, but if the filespecs are the same, DOS refuses to make a copy and remarks 'File cannot be copied onto itself'. However, if you give the copy a different name than the original, DOS will accept the command. If you type

COPY FORMAT.COM OESIGN.COM.

you will have two copies of the file on the disk drive A, each with a different name.

Once you have revised a number of files on a disk, the fragmentation can slow your work down considerably.

DISKCOPY

The COPY command is used to copy files one at a time. The DISKCOPY command copies a whole disk at once. This is handy for backing up disks, that is, making a backup copy that is kept

separate from the working disk.

In DOS 1.10, 2.00, and 2.10, if the target disk hasn't been formatted, DISKCOPY will format it while making the copy. Type

DISKCOPY A: B: (Enter)

The prompt on the screen will ask you to put the source disk in A and the target disk in B and strike any key when ready. ("Any" means any character key, not a function key or the <Ctrl> key.)

Before you strike the key, you should be aware that DISKCOPY erases everything on the target disk before copying the contents of the source disk. Use DISKCOPY only with a blank target disk or a disk you want to erase. Use the COPY command to add files to a disk that already contains information you want to keep.

Press any key when DISKCOPY is done, and the program will respond with 'Copy complete' and will ask if you want to copy another disk. Press N, and you will return to the A> prompt.

Because DISKCOPY creates an exact duplicate, each file occupies the same tracks and sectors on the new version as it did on the old, and fragmented files remain that way. Accessing fragmented files is slower than working with contiguous files, since more movement is required of the disk drive's read/write head. Once you have revised a number of files on a disk, the fragmentation can slow your work down considerably.

COPY, on the other hand, consolidates files. It copies all of a file into consecutive sectors before starting on the next one. By ridding the disk of fragmented files and gaps, the COPY command can shorten disk access time. But the actual copying process of DISKCOPY is much faster than duplicating each file individually with the COPY command.

While COPY is an internal command, DISKCOPY is external. Therefore, to take advantage of DISKCOPY's speed you must have the file DISKCOPY.COM on a disk

in one of the drives. In summary, DISKCOPY is simpler and faster while COPY is safer, more flexible, and eliminates fragmentation.

Wild cards

If you want to copy all the files on a disk, there is a third alternative to DISKCOPY and individual file copying with COPY. DOS offers a shortcut, using global characters

DOS interprets a question mark the way a card player interprets a joker, as a wild card.

called wild cards. DOS interprets a question mark the way a card player interprets a joker, as a wild card that can be substituted for any other character in the same position. For example, you can copy DISKCOPY.COM and DISKCOMP.COM with a single command. Type

COPY DISKCO??*.COM B: (Enter)

and both files are copied. However, typing

COPY DISK? B: (Enter)

won't work. The number of question marks must match the number of variable characters.

DOS recognises a second global character, the asterisk. Whereas the question mark acts as a wild card for a single character, the asterisk acts as a wild card for everything to the left or right of the filespec's period.

Therefore you can type

COPY DISK????*.B:

and avoid typing .COM.

If you want to copy every file that has the extension

.COM.

type

COPY* .COM B:

COPY A:* B: copies every file with out extensions from drive A to drive B. To duplicate everything on a disk in drive A (except hidden files), type

COPY *.* B:

COMP and DISKCOMP

Both the DISKCOPY and COPY procedures are usually error free, but if you are backing up critical disks or files, "usually" may not be good enough. The external command DISKCOMP compares disks to make sure they are the same. If you type

DISKCOMP A: B: <Enter> ,

DOS will compare the two disks to make sure every sector is identical. DISKCOMP is most commonly used when you are copying a program in which every byte is important.

You can also compare individual files. If you type

COMP A:DISKCOPY.COM B:DISKCOPY.COM
<Enter> ,

DOS first makes sure that the two special files are the same size and then compares them sector by sector. You can shorten this command to

COMP A:DISKCOPY.COM B:

or interchange the A: and B: designators. To see what happens if the files differ, type

COMP A:CHKDSK.COM B:DISKCOPY.COM
<Enter> ,

CLS

Anytime the clutter on the screen is confusing or not aesthetically pleasing, you can type

CLS <Enter>

to have DOS clear the screen. The command affects only the screen display, not the contents of memory or a disk.

ERASE

ERASE and DEL are identical commands that delete files from a disk. Perhaps you want to get rid of the DISKCOMP file on the disk in drive B to save space. Type

DEL B:DISKCOMP.COM. <Enter> ,

and you will notice that DISKCOMP.COM has been erased. You can also use wild-card characters with the ERASE or DEL command.

If you want to delete all the files with .COM extensions from the disk in drive B, type

ERASE B:* .COM <ENTER>

The most dangerous DOS command of all,

ERASE *.* ,

wipes the disk clean — but only after you reply affirmatively to the query 'Are you sure (Y/N)?'.

RENAME

To give a new filespec use the Rename command REN. As an example, copy FORMAT.COM from drive A to drive B using the COPY command. Then rename the file PREPDISK.COM. Type

REN B:FORMAT.COM B:PREPDISK.COM
<ENTER> .

Confirm the result by running a directory. You can continue to play with all these commands on the data disk in drive B.

The commands reviewed here are only the most frequently used DOS

functions. Armed with the functions and commands discussed in this article, you'll be able to use the operating system resources to run applications programs and manage files and disk storage. Consult the DOS manual for a description of the full range of DOS functions. **PC**

David Arnold is a professor of sociology and held the chair in the sociology department at Sonoma State University in California. He teaches a course on computers and society, is the author of "The Sociology of Subcultures", and has written a book about the IBM PCjr published by Holt, Rinehart and Winston.

Copyright © 1984 by David Arnold and PC World Communications, Inc. From "Getting Started with the IBM PC XT" published by Simon and Schuster, Inc. Printed by permission.



Australian



About IBM PCs and compatibles

**The
Complete
Australian
Magazine
for IBM
Personal Computer
and
Compatible
Users**

You are using or soon plan to use an IBM Personal Computer or compatible personal computer. You've just scratched the surface, just started to explore the vast potential of these remarkable machines.

How can you use this potential and get more out of your PC? How can you keep pace with the fast-moving developments in the field, with the rapidly growing body of available software and the new ideas, discoveries, applications and innovations of Australian users.

Now there's a way — with **Australian PC World**, the lively, authoritative, new magazine devoted exclusively to IBM and compatible PC users.

Every month **Australian PC World** will keep you posted on the most interesting, intriguing, and potentially useful applications for the IBM PC and compatible PCs. And it will explain them to you with a minimum of technical jargon — and with a degree of clarity you'll appreciate if you try them out on your own PC.

It's a magazine that will help you get more of everything you want out of your PC — utility, versatility, value and satisfaction. And it will present you with well researched, scientifically correct, easy-to-read articles in a magazine designed for Australian users. You'll want to keep each one for your future reference — beginning right now.

Now for a limited time only you can become a charter subscriber to **Australian PC World** and save up to 16 per cent off the regular price. Enter your subscription on one of the cards opposite today and you will receive 12 monthly issues at the low charter rate of only \$25 — a discount of \$5 on our normal rate of \$30. Indicate on your card that you wish to accept this discount offer. If you're not fully satisfied, cancel your subscription at any time, and we'll cheerfully refund the unexpired portion of your subscription.

If you already have an IBM personal computer or compatible or are thinking of buying one, then this is the magazine that revolves around you.

**Accept our discount,
12 issues for \$25**

*Place this completed subscription order card in a
sealed envelope and mail to:*

**Circulation Department,
Computerworld Pty Ltd,
P.O. Box 929,
CROWS NEST 2065, AUSTRALIA.**

*Place this completed subscription order card in a
sealed envelope and mail to:*

**Circulation Department,
Computerworld Pty Ltd,
P.O. Box 929,
CROWS NEST 2065, AUSTRALIA.**

Place in a sealed enveloped and mail to:

**Circulation Department,
Computerworld Pty Ltd,
P.O. Box 929,
CROWS NEST 2065, AUSTRALIA.**

The tiny portable computer you see below can do everything the average desktop can do. And more.

Meet the EPSON PX-8.

We believe this is the first real computer you could call a "portable".

As you can see, it's smaller than a transportable and considerably lighter – weighing 2.3 kg. Yet at the same time, it has a massive 64K RAM (expandable to 184K), a full 80-character Liquid Crystal Display and an excellent full-sized keyboard.

Normally you'd expect to find those specifications on a desktop computer.

But there's more. The EPSON PX-8 has inbuilt business software for word processing, graphics, spreadsheet, communications and many more custom programmes on simple plug-in ROM units. It also uses an extended version of Microsoft Basic and a CP/M* operating system – which means you have access to one of the world's largest software bases.

As well, the EPSON PX-8 can be used as a low cost, space saving, intelligent terminal that can be plugged directly into a mainframe or any high performance micro-computer like the EPSON QX-10.

And then it has features which you will never find on a desktop. Rechargeable NiCad batteries (with built-in back-up batteries to preserve data with a trickle of current until you resume operation). An inbuilt micro-cassette recorder for data storage while you're on the move. In fact, everything you would require for complete portability. The EPSON PX-8 and screen folds into a book-sized package that easily fits inside your briefcase.

PERIPHERALS. The EPSON PX-8 is more than just the first portable that performs like a desktop.

A complete range of portable peripherals has been designed to go with it.

There is a 3.5" battery-operated floppy disk unit with 360K formatted capacity. (There is also a standard 5.25" mains-driven version.)

There is a battery-operated Acoustic Coupler which allows you to use any phone – even the one in your car – as a direct communication line to your office or national data base.

There are 60K and 120k battery-operated RAM packs which can be permanently added to the PX-8, greatly enhancing its memory capacity, without sacrificing its portability.

There is also the EPSON P40 compact thermal printer which operates on NiCad batteries, as well as a complete range of dot matrix printers.

Personal computing has just taken a great leap forward. Although the EPSON PX-8 was designed from the ground up as a portable computer, it's going to make a lot of desktops look like dinosaurs.

And at only \$1,300** you could very easily make it your secret of success.

EPSON AUSTRALIA. Unit 3, 17 Rodborough Road, Frenchs Forest, NSW 452 5222. Suite 2, 173 Wickham Terrace, Brisbane, QLD 221 4033. Level 3, 543 Blackburn Road, Waverley Square, Mount Waverley, VIC 543 6455***

EPSON AUSTRALIA

PTY LTD

The Secret of Success.

*CP/M is a trademark of Digital Research Inc. **Recommended retail price not inclusive of sales tax. ***Victorian office open from July 10



HIDDEN IN THIS PICTURE IS A DESKTOP COMPUTER.

BASIC

Bricks and Mortar

A Basic program is built, not written. Donald Trivette shows you some of the steps.

You've had your IBM PC for several months; you've learned to run VisiCalc and WordStar; you've mastered DOS, at least as far as formatting disks and backing up files; now you're ready for the fun — writing your own programs. In preparation, you've skimmed a book on Basic and read chapters 2 and 3 of the IBM Basic manual. (If you haven't read these chapters, do so now.) All well and good, but how to begin?

First you need a problem to solve, one that you can do by hand or in your head. If you don't know how to solve the problem manually, you can't possibly tell a machine how to come up with the answer.

This article shows you how to write a program to count the number of words in a disk file. If the file were a typewritten report, you would start in the upper left corner of each page and count each word in each line, top to bottom, page after page. When there are no more pages, you have the answer.

Now that you know how to do it manually, which admittedly would take a dunce about one second to deduce, you think about how to actually get started programming.

Computer programs are built, not written. Even the most experienced programmer doesn't start at the beginning and work straight through to the end. Start with the core and work outward — add a statement here, move a statement there, test a section, add a few more statements, test again, try something different. Programming is not a sequential or exact process.

When you wrote a term paper in school, you made note cards, an outline, a draft, and then the final report. Didn't you? Books that teach

computer programming recommend that you write a flow chart first (the outline), and then translate that into a computer language. A good idea, but in practice most flow charts, like most outlines, get written after the program. It's human nature.

You could begin by writing statements to read records from a disk file, but that's not much fun. Input/output statements are tedious, and I always need to get out the manual to check on formats, commas, device numbers, and the like. A better plan is to get the program running first with a simple statement that will provide data to test the word-counting algorithm (algorithm is a fancy way of saying plan or method), and worry later about getting the data from disk.

Building the program

The following will do as a first statement to test the counting program.

100 A\$="The quick brown fox jumped over the lazy dog."

'A\$' was selected as the variable name for no other reason than that it is short and easily typed. It could just as well have been 'SENTENCES\$' or 'MYDATA\$'. In fact, if you like self-documenting programs, it probably should be something more descriptive. If you're lazy, A\$ is fine. The dollar sign after the A tells Basic that the variable will store characters rather than numbers. Variables that store characters are called string variables.

Next you'll need a statement or statements to compute how many words are in A\$. That's the

algorithm. Suppose you count the number of blanks. That works as long as one word is separated from another by a blank. Thus the definition of a word will be a group of characters separated by blanks. This means you will be counting things like 5280', 280Z, and 5'9" as words. Whether this is acceptable largely depends on why you're counting words in the first place. If you are a typist paid by the word, then it's acceptable to count "\$.10" as two words.

In order to count blanks your program must find blanks. The Basic function INSTR (IN STRing) can do that.

```
100 A$="The quick brown fox jumped over
the lazy dog."
120 I=INSTR(J.A$, " ")
```

INSTR will start looking in A\$ at position J for the first occurrence of " "(blank). It will assign the position of the first blank it finds to the variable I. This seems to be what we are after, but we must give J an initial value — a place to begin looking.

This can be done with the following statements:

```
100 A$="The quick brown fox jumped over
the lazy dog."
118 J=1
120 I=INSTR(J.A$, " ")
```

Just to be sure you understand how INSTR works, put a temporary print statement after line 120 (for example, 125 PRINT I) and run the program. The value of I should be 4 — the location of the first blank. Type RUN and press (ENTER), you should see

```
100 A$="The quick brown fox jumped over
the lazy dog."
118 J=1
120 I=INSTR(J.A$, " ")
125 PRINT I
RUN
4
OK
```

This last step demonstrates the value of working with an interactive language like Basic. Whenever you are unsure of how a section of a program works, you can put in print statements temporarily and run it.

Now that you have found the first blank, you have also found the first word. The next step is to add a statement to keep count of the words — something like W=W+1. Initial values

If you don't know how to solve the problem manually, you can't possibly tell a machine how to come up with the answer.

should go at the top of the program, so you should add these lines to produce the following:

```
20 W=0
100 A$="The quick brown fox jumped over
the lazy dog."
118 J=1
120 I=INSTR(J.A$, " ")
125 W=W+1
```

The new line 125 replaces the PRINT statement added earlier.

We are now ready to loop — to go back to line 120 and look for the next blank. If you don't make changes, the program will look for the next blank starting in position 1, and it will find the blank in 4 again. This is an example of the famous endless loop (few things are actually endless; after several minutes the value of W would get so large that the computer would report an error and stop). To avoid this, set J to the value of I+1. This causes the computer to resume looking one position after where it found the last blank.

```
20 W=0
100 A$="The quick brown fox jumped over the
lazy dog."
118 J=1
120 I=INSTR(J.A$, " ")
125 W=W+1
130 J=I+1
140 GOTO 120
```

Type RUN and press (ENTER) to see what happens. If you don't know what the (Ctrl) (Break) keys do, now is a good time to learn. The program is in an endless loop again. To find out what's wrong, insert as a temporary statement 121 PRINT I and rerun the program.

```
20 W=0
100 A$="The quick brown fox jumped over the
lazy dog."
118 J=1
120 I=INSTR(J.A$, " ")
121 PRINT I
125 W=W+1
130 J=I+1
140 GOTO 120
```

The screen will rapidly fill with 4, 10, 16, 20, 27, 32, 36, 41, 0, 4, 10, 16. Those are locations of the blanks all right, but when the program gets to the end of the sentence, it goes back to the beginning, over and over. Why?

When the INSTR functions doesn't find a blank, it returns a zero value. Zero plus 1 is 1, so J is reset to 1 and the program begins looking at the first character again. In short, you didn't tell it what to do when there were no more blanks. You need an IF statement and a statement to print the value of W. The program should look like this:

```
20 W=0
100 A$="The quick brown fox jumped over the
lazy dog."
118 J=1
120 I=INSTR(J.A$, " ")
122 IF I=0 THEN 150
125 W=W+1
130 J=I+1
140 GOTO 120
150 PRINT W
```

Just one problem: The program counts the number of words as eight (there are nine). This is the old fence post paradox — how many fence posts, spaced 10 feet apart, does it take to erect a 100-foot fence? One more than you first thought. There is one more word in your sentence than there are blanks. This calls attention to a flow in the algorithm — it's counting blanks instead of words. What would happen if a typist put two blanks between some words? If you're in doubt, alter the text in line 100 and run the program.

The solution is to add statements to cause the program to skip over consecutive blanks without incrementing the word count. You can do this by saving the location of the last blank (we will call it OLDI), and comparing it with the position of the current blank. If the location of the current blank (I) is just one greater than the location of the old blank (OLDI), you do not want the word count to increase. Instead, OLDI should be set equal to I, and the program should look for the next blank. It's a little confusing at first, but this idea is used frequently in computer programming. Three statements are needed to modify the algorithm.

```
20 W=0
100 AS="The quick brown fox jumped over the
lazy dog."
105 I=0
118 J=1
119 OLDI=I
120 I=INSTR(J,AS," ")
122 IF I=0 THEN 150
123 IF OLDI+1=I THEN 130
125 W=W+1
130 J=I+1
140 GOTO 119
150 PRINT W
```

Be sure to change line 140 to jump to line 119 instead of to line 120.

We still have the problem of the last word not getting counted when there are no trailing blanks. One way to assure that a trailing blank will be there is to always add one. A

If the purpose of the program is to fire MX missiles based on a word count, then it is a serious bug indeed. This program will give only an idea of length.

statement like `104 AS=AS+" "` would accomplish this.

```
20 W=0
100 AS="The quick brown fox jumped over the
lazy dog."
104 AS=AS+" "
105 I=0
118 J=1
119 OLDI=I
120 I=INSTR(J,AS," ")
122 IF I=0 THEN 150
123 IF OLDI+1=I THEN 130
125 W=W+1
130 J=I+1
140 GOTO 119
150 PRINT W
```

But does it really work? You can't be sure until you've tested every combination of data you can imagine. Here are some sample tests.

```
100 AS=" The quick brown fox jumped the
brown dog. "
100 AS="The quick brown fox jumped over
the lazy dog and the lazy dog jumped over
the quick fox."
100 AS="The quick brown fox jumped over
the lazy dog and the lazy dog jumped over
the quick fox."
100 AS=" "
100 AS=" "
100 AS="The brown fox ."
```

The last test points to a problem. The program counts four words in "The brown fox ."; the period is counted as a word because it is preceded by a space.

Is this a bug? The answer depends on how the program is to be used. If the purpose is to fire MX missiles based on a word count, then it is a serious bug indeed. Fortunately, this program will give only an idea of the length of a document.

Even after careful testing you can be sure someone, some day, will try to use your program for a purpose or with data you never intended. If the program gives the correct answer, the user will feel like a genius; if not, he or she will swear there's a bug in your program.

Reading a disk file

The next step is to add statements to cause the program to read data from a disk file. Basic supports two types of files: Random files store data in groups called records (when you are done with one record, you must specifically select the next record you want); sequential files store all data as one large group. Text is usually stored in a sequential file, so this demonstration will use input statements that perform sequential input.

There are two such statements — `INPUT #` and `LINE INPUT #`. `INPUT #` reads a string of characters until it finds a comma and then terminates. Clearly this is not what you want. The `LINE INPUT #` statement reads all the characters in the input file until it encounters a carriage return. But the maximum length of a string is 255 characters, and since it is entirely possible that your data file will contain more than 255 characters in a row without a carriage return, the `LINE INPUT #` statement cannot be used. To get around this limitation, use a series of commands to read the file in 255-character chunks. In place of the assignment statement in line 100, change the program as follows:


```

20 W=0
40 OPEN "WOROS.BAS" FOR INPUT AS #1
90 AS=""
100 FOR X=1 TO 255
101 XS=INPUT$(1, #1)
102 IF XS=CHR$(13) THEN
    AS=AS+" ":GOTO 105
103 AS=AS+XS
104 NEXT
105 I=0
118 J=1
119 OLDI=I
120 I=INSTR(J, AS, " ")
122 IF I=0 THEN 150
123 IF OLDI+1=I THEN 130
125 W=W+1
130 J=I+1
140 GOTO 119
145 CLOSE #1
150 PRINT W

```

This change prevents lines from becoming longer than Basic can handle (255 characters).

Unfortunately, by removing the `AS=AS+" "` statement we've re-introduced the trailing blank bug.

But there's a better way to fix this bug that also avoids another potential pitfall. We can simply count the end of a line as a blank, and then count the words in that line and keep a running subtotal. This allows us to reset `AS` to an empty line and reuse it for each succeeding line.

In addition to `OPEN`, `CLOSE`, and `INPUT`, you'll need to modify the program logic to loop back to line 100 so that, once it has counted the words in one character string, it will go back for another. You can do this by modifying line 130. When you run the program in this form, you will see the error "Input past end in line 100". Also, the program won't print out the number of words in the file.

```

20 W=0
40 OPEN "WOROS.BAS" FOR INPUT AS #1
90 AS=""
100 FOR X=1 TO 255
101 XS=INPUT$(1, #1)
102 IF XS=CHR$(13) THEN
    AS=AS+" ":GOTO 105

```

```

103 AS=AS+XS
104 NEXT
105 I=0
118 J=1
119 OLDI=I
120 I=INSTR(J, AS, " ")
122 IF I=0 THEN 90
123 IF OLDI+1=I THEN 130
125 W=W+1
130 J=I+1:IF J>255 THEN 90
140 GOTO 119
145 CLOSE #1
150 PRINT W

```

Line 150 prints the value of `W`, but the program doesn't have any way to get to line 150. Simple as this is, it's one of the most common errors in programming. If something doesn't work, at least half the time it's because the statements aren't getting executed.

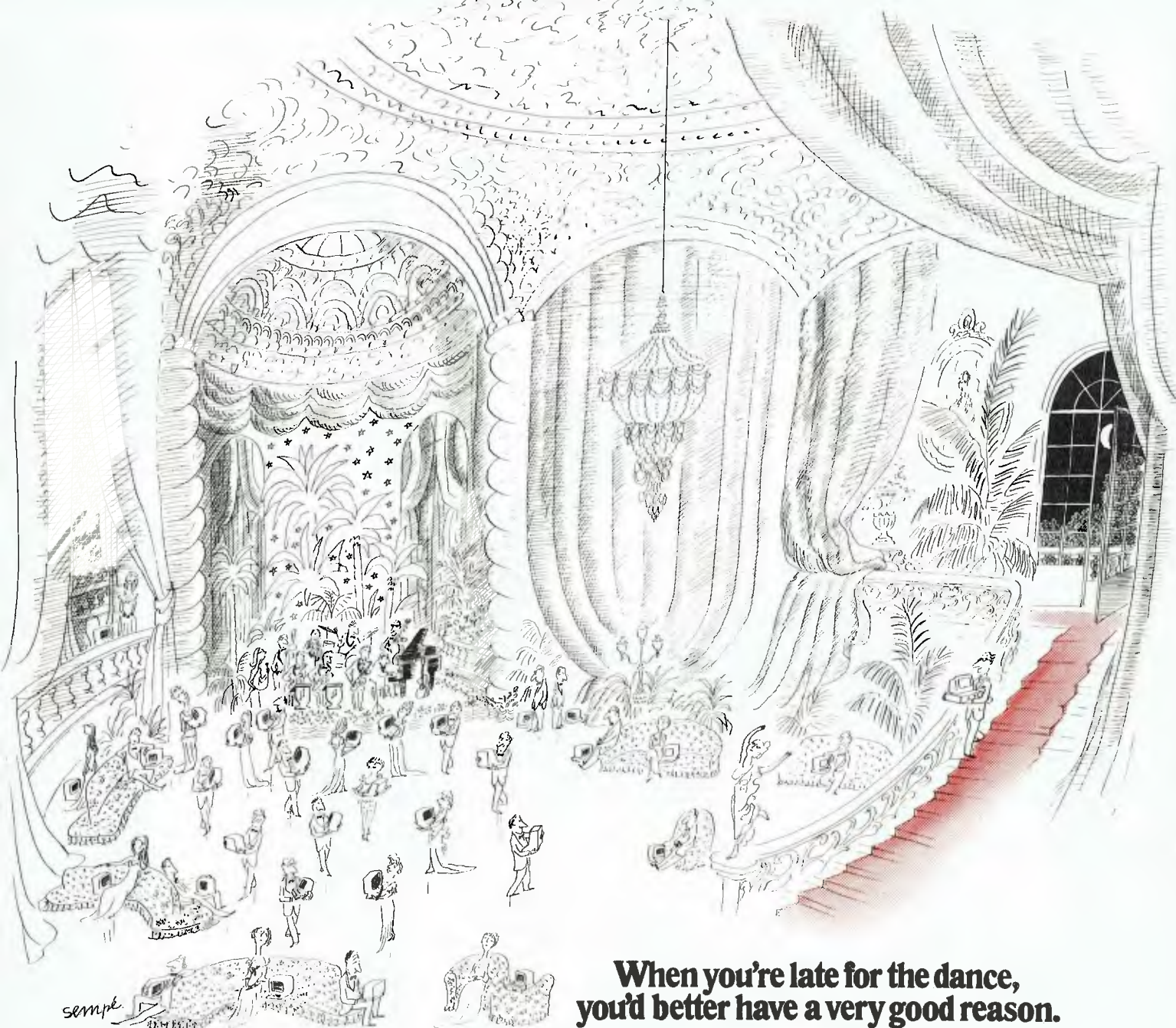
The message about "Input past end..." probably won't make sense to the beginning programmer. When a Basic program reads the last

```

10 DEFINT A-Z
15 PRINT "This program counts the number of words in"
16 PRINT "a sequential ASCII file by counting the blanks"
17 PRINT "between groups of characters."
20 W=0 'word counter
35 PRINT:INPUT "ENTER FILENAME:";FILENAME$
40 OPEN FILENAME$ FOR INPUT AS #1
90 PRINT:PRINT "RUNNING TOTAL IS ";W;" WORDS":AS=""
100 FOR X=1 TO 255
101 XS=INPUT$(1, #1)
102 IF XS=CHR$(13) THEN AS=AS+" ":GOTO 105 'convert CR to a blank
103 AS=AS+XS:IF EOF(1) THEN 145
104 NEXT
105 I=0 'location of blank
106 PRINT AS
118 J=1 'start looking here
119 OLDI=I 'save location of last blank
120 I=INSTR(J, AS, " ") 'find a blank
122 IF I=0 THEN 90 'get next line
123 IF OLDI+1=I THEN 130 '2 blanks together, don't add
125 W=W+1 'add one to count
130 J=I+1:IF J>255 THEN 90 'next location
140 GOTO 119 'keep looking
145 CLOSE #1
150 PRINT:PRINT FILENAME$;" CONTAINS ";W;" WORDS"

```

Listing 1: The final version of a word counting program . . . Or is it?



**When you're late for the dance,
you'd better have a very good reason.**

The party started about three years ago for the personal computer.

And there was dancing.

But there wasn't much talking. Because as more and more computer companies arrived, there were some very real compatibility problems.

Until one latecomer arrived. Sperry.

With a remarkably simple solution. The Sperry PC.

It was able to run all IBM compatible software.

It was able to run all this software with

stunningly more dramatic graphics and from a substantially more comfortable keyboard than IBM's.

And, with the flick of a special "turbo" switch, the Sperry PC could even run 50% faster than IBM.

Enough for one night? Not for the people from Sperry.

For the Sperry PC had the additional ability to plug into the real brains of an organization — the main computer. Whether that system was IBM or Sperry.

Or both.

The Sperry PC.

An admittedly attractive arrival.

But when you get there late, you'd better have something important to bring to the party.

Contact Geoff Saunders,
Sperry, Northpoint,
100 Miller Street,
North Sydney, N.S.W. 2060.
(02) 929 7800

© SPERRY Corporation, 1983

SPERRY PERSONAL COMPUTER SPECIFICATIONS

OPERATING SYSTEM

MS DOS Version 1.25 or 2.0 with G.W. BASIC
MICROPROCESSOR
High-Speed 16-bit 8088
DISPLAY SCREENS
High Definition monochrome display.
High resolution color display. IBM compatible graphics.
COMMUNICATIONS
Built-in Asynchronous
KEYBOARD
84 keys, 6 ft. cord

AUXILIARY MEMORY

Up to two internal 5 1/4" diskettes
10MB internal fixed disk when configured with single diskette
USER MEMORY
Standard 128K bytes, expandable to 640K
DIAGNOSTICS
Power-on self test
CLOCK
Time-of-day with battery back-up

SPERRY



**The Sperry PC.
What the personal computer
should have been in the first place.**

record in a disk file, it notices (and remembers) that it has reached the End of the File (EOF). If you try to read from that file again, Basic displays the message "Input past end..." and stops the program. Check Appendix A of the Basic manual for explanations of error messages.

If you thumb through the Basic manual (maybe a lot of thumbing if you don't know what to look for), you'll find a built-in function called EOF. The value of EOF is false until the last data is read, and then it is true. You can use this to signal the program to jump to line 145 when it can't read any more records.

The placement of this statement is confusing. If you put it after the INPUT statement, the last data won't get processed. The EOF condition is set when the last record is read — not after — so we must check the condition before the next input. Modify line 103 by adding an end of file test. You should also modify line 122 to jump back to line 90, rather than jumping to line 150.

```
20 W=0
40 OPEN "WORDS.BAS" FOR INPUT AS #1
90 AS=""
```

```
100 FOR X=1 TO 255
101 XS=INPUT$(1,1)
102 IF XS CHR$(13) THEN
    AS=AS+XS:GOTO 105
103 AS=AS+XS:IF EOF(1) THEN 145
104 NEXT
105 I=0
118 J=1
119 OLDI=I
120 I=INSTR(J,AS)
122 IF I=0 THEN 90
123 IF OLDI+1=I THEN 130
125 W=W+1
130 J=I+1: IF J>255 THEN 90
140 GOTO 119
145 CLOSE #1
150 PRINT W
```

For a final test, run the program on itself. It counts 67 "words" — 67 groups of characters separated by one or more blanks.

Clean-up

The final two steps in writing a program are clean-up and documentation. In the clean-up phase you should look for ways to make the program more efficient — to eliminate unnecessary statements and perhaps combine others. You might realise that counting words is an integer task. Basic makes more

efficient use of storage if it knows that everything will be whole numbers. Statement 10 DEFINES all variables starting with the characters A through Z to be INTEGERS.

Clean-up also involves making the input and output as friendly and easy to read as possible. For this example, your program will print a description of what the program is designed to do, ask the user for the file name, and tidy up the output. The friendly, documented, more efficient program is now what you see in Listing 1.

No program is ever finished; there's always some way to make it more efficient, easier to use, more useful, and better documented. In this program, statements 123 and 125 could be combined; the program could check to be sure the file name exists on the disk and report an error if it doesn't; you could produce a frequency count by...and you could ...

PC

Donald Trivette is a computer consultant based in Wrightsville Beach, North Carolina.

MASS[®]

MICROPROCESSOR APPLIED STATISTICS SYSTEM

IF YOU'VE BEEN WAITING FOR ACCURATE MICROCOMPUTER SOLUTIONS TO REAL STATISTICAL PROBLEMS, THEN YOU'VE BEEN WAITING FOR MASS!

A necessary tool for researchers, educationalists, business professionals and other data analysts.

MASS provides:

- Summary statistics • Two-sample statistics
- Non-parametric statistics • Multiple linear regression • Analysis of variance • Powerful cross tabulation • Plots.

From within MASS:

- Data entry may be from keyboard or disk

- file • Data may be formatted or free field
- Results may be directed to the screen, printer or disk file • Large data sets are handled • Data may be edited or transformed
- Batch mode execution facility for routine tasks • Extensive help text is provided.

Now available for machines of the Z80/8080 class running under CP/M, and of the 8088/6 class running under CP/M or MS-DOS. The 8087 and AMD9511 arithmetic chips are also supported.

For more information, contact:

MASS OFFICE,
PO Box 247, Nedlands 6009.
Western Australia. Phone: (09) 386 4647.

The Lowdown on the Low End

The contest in the business personal computer market is strong, but the cheapest 16-bit personal computers have been virtually ignored.

Before the PC was released two years ago, every personal computer manufacturer hoped its design would not be a market leader. Instead, each manufacturer hoped its design would be similar enough to the rest of the market offerings to give the potential buyer a sense of security.

The rapid acceptance of the PC changed the approach to personal computer design, in that it provided a firm benchmark for specifications and performance with which all manufacturers had to comply. Some manufacturers decided they could produce a system similar to the PC, but at a lower price. Others decided that a system which at its worst was PC-compatible but otherwise offered better performance would be more attractive to potential buyers.

As a result, a three-tier market developed for PC-compatibles. At the top are those systems which can "degrade" their features and performance to match the PC, but at a similar price. In the middle are systems that offer high PC-compatibility and equivalent performance, but at lower prices. At the bottom are those computers designed to a price consideration first, with PC-compatibility forced into the design as a trade-off against a slightly higher price.

The Sanyo MBC-550 and the Dick Smith Challenger are two personal computers from this lowest market tier available in Australia. Both machines compete in the PC-compatibility stakes, but are aimed at buyers more interested in price and performance than in PC-compatibility. But this is all these

two machines seem to have in common.

The Challenger offers PC-compatibility almost as an afterthought, being primarily aimed at the hobbyist and enthusiast rather than at the buyer who needs a personal computer for business. As marketed in Australia, the Challenger's PC-compatibility is emphasised at the expense of other more noteworthy features such as its 8086 processor and its unique expansion bus that incorporates 16 data lines. The problem is that these features do not support PC-compatibility, are considered unimportant by the distributor and are not relevant to buyers only wanting PC-compatibility.

On the other hand, the Sanyo MBC-550 was purposefully designed by Sanyo to be both PC-compatible and to be a distinct low-cost alternative to the PC in the role of a small personal (and professional) computer system. It seems that Sanyo had hoped, after the difficulties it had marketing its 8-bit business computers, that a low-cost PC-compatible machine which could do better than meet the minimum requirements for a small business computer, would do better in the market.

The MBC-550's PC-compatibility is not an afterthought — it has been incorporated into the design from the very beginning — but it is not treated as a major marketing point. Instead, the MBC-550 is being treated as a complete low-cost system offering PC-compatibility as an extra. Its other features, such as high-resolution color graphics,

high quality of design and manufacture and a very low price-tag, are treated as the major selling points.

Both the Challenger and the MBC-550 offer low-cost software. The Challenger offers the Perfect range bundled into the system's price, while the MBC-550 offers the MicroPro range at a much-reduced price. The difference between the two systems is that the Perfect software range is considered to be of lower quality and utility, while the MBC-550's MicroPro bundle is virtually an industry standard backed by an aggressive international marketing campaign.

Both systems sell for less than two-thirds of the price of a similarly configured PC, and both offer a similar degree of PC compatibility (but in different areas).

The systems differ; the Challenger was simply a system Dick Smith Electronics found could fill a market niche even though it was designed for another purpose, while the MBC-550 was designed for that market niche from the outset.

Market reaction to both systems has astonished both companies. The Challenger is doing well in the medium and large business market even though its design, documentation and support are not really adequate to serve these markets. The MBC-550 is selling consistently well, especially to original equipment manufacturers, with demand so much outstripping supply that there are not enough stocks to allow a formal launch.

Despite their obvious differences, these machines are competing against each other in a two-horse race, with the winning post well out of sight in the distance. While there is enough room for both to survive in the near future, the much-predicted shakeout among personal computer manufacturers could so reduce the size of the market at this price/features level that next year could see one (or even both) squeezed from existence despite the fine offerings of both systems.



Left: Sanyo MBC-550 (555-2 model).
Below: Dick Smith Challenger (Advance 86).



Dick's Plastic Challenge

Is Dick Smith's latest PC compatible really such a challenge? Ian Robinson dares to find out.

Following hard on the heels of the success of the PC and its clamouring crowd of compatibles came the news that Dick Smith Electronics was to leap on to the PC-standard bandwagon with its own version. After the usual preliminary bell-ringing and whistle-blowing that tends to accompany such announcements, the Challenger was distinctly noticeable by its absence.

For several months, this embarrassing silence was interrupted only by a few special guest appearances at various computer shows around the country. Now at last the much discussed Dick Smith Challenger has finally been unleashed upon the PC-buying public, opening up yet another market for the notorious Electronic Dick.

What it looks like

Darth Vader is the image that springs to mind when viewing the Challenger for the first time — big, black and chunky, with an oversized keyboard and imposing system unit. At least it makes a change from some of the more recently-released PC compatibles, which seem to be attempting 100 per cent visual compatibility as well as functional compatibility. Darth Vader turned out to be a good guy in the end anyway.

Although bulkier than the IBM PC, the Challenger lacks the solid and secure feeling of its forebear, and has a cheap plastic look about it, reminiscent of the early Tandy machines. The Challenger is not quite as heavy to pick up as the PC, although moving it about could become an awkward and clumsy

exercise because the system is actually two separate black boxes, linked by ribbon cables on one side. On the other hand, the Challenger keyboard plugs into the front of the machine and fits neatly inside a special enclosure within the lower system unit; definite improvements on most other desktop compatibles.

The Challenger is actually a renamed version of the Advance 86 computer, manufactured in the UK by Ferranti Computer Systems Ltd. (In fact the shipping cartons that our review machine arrived in were endorsed with the Advance 86 logo, as were the bundled software disks.)

Following the overwhelming success of the ZX81, black plastic computers seem to have captured the imagination of the British computer-buying public, although any similarity with a Sinclair machine ends there. Recent Dick Smith advertisements feature a white Challenger, so it could be that only the early models are black.

Surprisingly, the Challenger makes more noise than a PC when it is powered up. And the color monitor — a Dick Smith add-on — emits a very high-pitched whine, which could become very distracting after many hours of use. The slimline disk drives are quieter than the PC, both in normal operation and when accessing disks.

Hardware

The Challenger consists of a system unit which is slightly lower and wider than the PC, coupled to an optional expansion unit that is roughly twice as high and is designed to sit on top of the system unit. While the minimal (system unit only)

Challenger functions as a bare-bones 8086 personal computer, it has no disk drives or expansion slots, so its claim as a PC compatible is dubious. (The amount of PC software available on cassette is extremely limited, if not non-existent).

Once the expansion unit has been added, however, the Challenger is transformed into a very PC-compatible computer. Four standard expansion slots are provided; one is used by the disk controller card, and two elongated expansion slots are designed for boards which take advantage of the extended data bus of the 8086 microprocessor. The PC and most of its imitators employ an 8088, which communicates to the outside world in eight-bit words (bytes), whereas the Challenger contains an 8086, which talks in 16-bit words. The additional connectors present on the elongated expansion slots provide access to the extra pins of an 8086 chip.

Small plastic knockout panels must be removed whenever standard PC expansion boards are fitted to the Challenger, but otherwise system expansion is similar to the PC and other compatibles. Joining and separating the two Challenger boxes also involves fiddling about with plastic panels — in this case the ones along each side of the computer. I don't know of any other computer in this class with such a high plastic content — even considering the various Japanese models.

Software

Besides Advance 86 DOS (alias MS-DOS Version 2.11), the Challenger arrives bundled with the Perfect series of software (Perfect Writer, Perfect Speller, Perfect Filer and Perfect Calc). Users tend to take a very polarised attitude to this suite of programs — they either love it or hate it. These programs are adequate, and definitely better than nothing at all, but as they have been comprehensively reviewed many

times in the past, I shall leave it at that.

The Challenger DOS is fully interchangeable with PC-DOS, although the master disk contained fewer DOS utilities than usual and no demonstration programs at all. Although the disk Basic was named BasicA, as on the IBM PC, it is really another version of Microsoft's GW-Basic. As with most compatibles, the Challenger totally hangs up when you attempt to run the real PC BasicA; in fact the machine has to be switched off, as the keyboard reset is somehow disabled.

The PC MODE utility is replaced with the SET40 and SET80 commands, which toggle between 40 and 80-column modes. The DISKCOMP utility is also missing, replaced by a program called FC, which is a lot more versatile. One would expect to see a few more

spectacular demonstration programs appear in the future as the Dick Smith technical staff become more familiar with the machine.

Among the various software packages claimed to run on the Challenger are WordStar, dBase II, Multiplan, Flight Simulator and Lotus 1-2-3, which makes it very compatible. Programs that are known to experience difficulties on the Challenger, besides the true PC Basic, include Microsoft Word, Data Base Manager II, Fastgraphs and Microsoft's Decathlon.

Documentation

The Challenger documentation is barely adequate. A small blue plastic 3-ring binder is supplied with each of the black boxes. The system unit manual describes the keyboard, memory, serial and parallel ports,

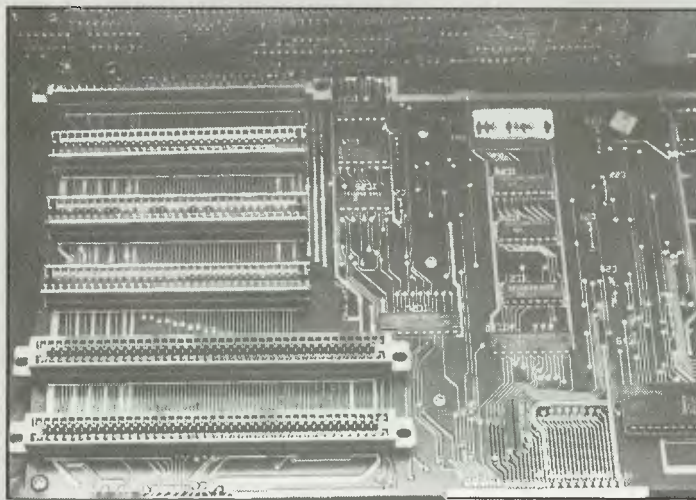


The Dick Smith Challenger, showing system unit, expansion unit, and DSE color monitor.

THE 8086 — WHAT ADVANTAGE?

ONE of the purported "better-than-IBM" features that the Challenger shares with several other PC compatibles is its 8086 microprocessor. For expansion hardware to fully exploit the speed increases inherent in this true 16-bit CPU, access is required to the 8086's extra eight data lines. Therefore the two elongated expansion slots have been provided, but so far no hardware exists to plug into these.

Execution speed is the only noticeable difference when standard software is being used on an 8086-based machine, and if this is important to an application it constitutes a definite advantage over the PC. Software that is disk I/O-bound, however, will continue



Four standard PC expansion slots and two longer ones — why?

to be plagued by the limitations of disk access speeds, and may not differ greatly in speed from the PC.

Upgrading a compatible to an 8086 provides no real gain in the maximum amount of directly-addressable RAM, or the maximum amount of contiguous RAM, because of the limitations of PC architecture. The available

contiguous RAM space in a PC is rigidly enclosed by bounds defined by the motherboard RAM and the video RAM, and any changes to this memory map layout would result in a loss of PC compatibility. Beside that, very few of the standard PC software packages would be able to take advantage of memory outside these limits.

monitor, and the built-in ROM Basic. The expansion unit manual goes on to explain DOS and the Perfect software series. Most pertinent areas are covered in the manuals, albeit briefly, but there is a lack of good diagrams and technical information.

The installation instructions are a bare minimum, compared to the high standards set by Dick Smith Electronics' multitude of construction kits and electronic appliances. A simple How To Set Up guide (even a single sheet) would be an improvement much appreciated by first-time users. The total lack of system diagrams is in marked contrast to IBM's exhaustive and well-printed manuals.

Anyone contemplating doing anything adventurous with a

Challenger, such as non-trivial programming, will be forced to seek supporting literature. However, for those users (and there may well be many) who intend their machine to spend most of its time running a single application program, such as a word processor or accounting package, this could well be all the documentation that they will ever require.

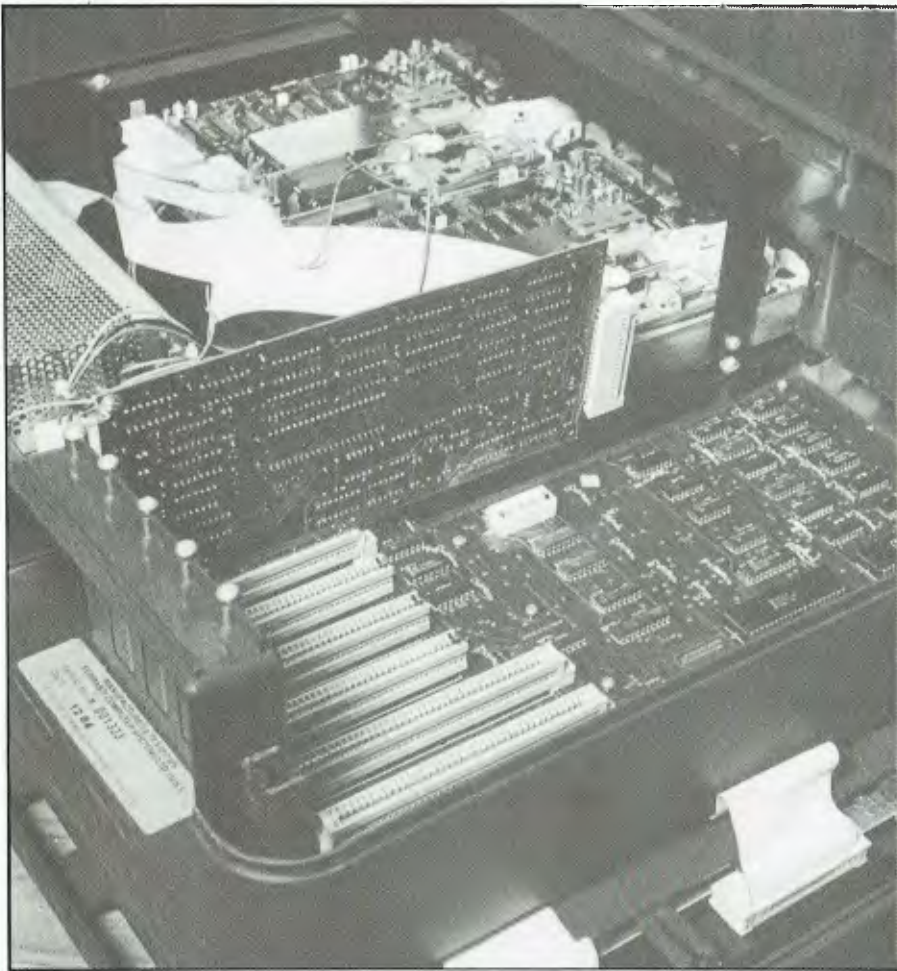
Support

The Challenger is covered by the traditional 90-day warranty, and Dick Smith Electronics guarantees a repair turnaround times of less than a week. There is also optional extended warranty cover available at a cost of about 5 per cent of purchase price per annum.

In each case the Challenger needs to be taken only as far as the nearest Dick Smith branch, and these are in abundance throughout the country.

Dick Smith Electronics already advertises a large range of software for the Challenger, but not much expansion hardware, although a 384K-byte memory expansion board is promised for the near future. No boards exist that will fit into the enlarged expansion slots, but the promise of the extra speed gained by using this bus should spur on hardware developers, according to a Dick Smith spokesperson.

Also in the pipeline from Dick Smith Electronics is an external 10M-byte fixed disk, and no doubt other products should appear as time goes by. Two more slimline disk drives can also be fitted inside



Interior of Challenger, showing slimline drives, controller card and heaps of empty space.

the Challenger expansion unit itself. As the video controller hardware is already built in to the system unit, along with the hardware for the parallel and serial interfaces, the Challenger expansion slots allow a little more system versatility than the PC.

The Final Word

If you are on a tight budget, but still desperately keen to get hold of a minimal 8086-based system, the Challenger system unit is probably worth considering, because it is readily expandable should more funds become available later. (Astute marketing has priced the system unit below the psychological barrier of \$1000, but this does not take into account the cost of a

monitor or cassette.) However, it becomes debatable whether the system unit by itself could be deemed a PC compatible at all, because it does not have the two main advantages of a compatible system, namely the ability to accept PC expansion boards (no slots) and the ability to read PC disks (no drives!).

On the other hand, if you intend buying a full-blown expanded business PC with all the bells and whistles, then take a very good look around at what else is available before making your decision. Some of the more recent Taiwanese PC compatibles appearing in Australia offer all (or more) of the Challenger's attractive features, and definitely challenge the Challenger on price.

PC

Dick Smith Challenger

CPU:

Intel 8086 (4.77MHz)

Memory:

128K RAM; expandable to 256K. 64K ROM.

Disk Drives:

Two 360K 5¼in floppy disk drives. Optional external hard disk.

Interfaces:

1 parallel port; 1 serial port; 1 joystick port; 1 light pen port.

Keyboard:

Detached with 84 keys.

Display:

25 lines by 80 characters monochrome or color; 640 by 200 pixel monochrome or color graphics.

Weight:

11kg system unit; 14kg expansion unit; (not including monitor).

Operating System:

MS-DOS 2.11

Software:

Microsoft GW Basic; any PC software that does not make hardware calls; Perfect series.

Price:

\$995 (system unit with 128K RAM, color and graphics, parallel port, no monitor).
\$1995 (expansion unit, 360K floppy drives, serial port, 3 IBM PC expansion slots).
\$249 monochrome monitor.

Distributor:

Dick Smith Electronics
PO Box 321
North Ryde NSW 2113
Tel: (02) 888 3200.

A PC at Half the Price

The Sanyo
MBC-550 is
not a
challenge to
the PC, but it
offers PC
features at
half the price.
Neville
Angove
reports.

Sanyo is a name most often associated with consumer electronic appliances that combine high quality and functionality with reasonable pricing. With the MBC-550 series of small business computers, Sanyo has created a business computer that emulates the PC but would still be at home on the shelves of any major electrical retailer.

Hardware

The MBC-550 has the same general configuration as most 16-bit desktop personal computers, with a system unit, detachable keyboard, and a choice of monochrome or color monitors. The appearance, though, differs significantly from that of most IBM PC-compatibles.

The system unit is only about two-thirds the size of that on the PC, with a light metal case colored gun-metal grey. In the dual-drive versions, two slimline floppy disk drives sit side-by-side, taking up most of the width, with only enough room on the right for the Sanyo logo and a power switch. Air vents run along the sides and back, but the fan exhaust is located under the unit.

The keyboard, with 85 keys, is connected to the backplane of the system unit by a half-metre-long coiled cable.

The backplane of the system unit bears little resemblance to that of the PC. The power cord is wired into the unit on the left (when the system unit is viewed from the back), with the fuse above it. To its right is an air intake, and to the lower right of this are a parallel printer port, color and monochrome

video output connectors, and the keyboard connector. To the upper right are three removable panels for a serial port, joystick connector and external expansion.

The expansion slot openings we have come to expect on a PC-compatible do not exist, because the MBC-550 series does not have an expansion bus.

The heart of the MBC-550 is a single motherboard, carrying 128K-bytes of RAM, with sockets for two more 64K-byte blocks. There is an Intel 8088 processor, a vacant slot for an 8087 coprocessor and a connector for a serial board. The circuitry for color and monochrome graphics, as well as the floppy disk controller and parallel printer, are built in.

The keyboard is the same size as that of the PC, but with a different arrangement of some of the keys. There are only five keys in the function keypad, which can be shifted to use all 10 functions. The return key is the size of four normal keys, the shiftlock key has a LED, and there is a graphics lock key which causes the keyboard to output an alternative graphics and foreign language character set.

As far as I am concerned, the most important change to the keyboard has been the removal of the < and > characters to a new key, allowing the comma and full stop to be used when these keys are shifted and unshifted.

To the upper left of the keyboard, on the side, is a recessed reset key. The keyboard also has two extending legs at the rear for height adjustment.

The green phosphor monochrome display sold by Sanyo for the MBC-

555 is a little smaller than the PC's, but still handles the 25 lines by 80 columns display generated by the video controller. Even though the characters are composed from a smaller matrix (the same as on the PC's color monitor), which reduces their clarity, the effect of this is largely offset by the anti-glare treatment of the screen.

The color monitor sold by Sanyo for the MBC-550 (although any RGB monitor will do) overwhelms the small size of the system unit. It displays rich, intense colors, with no hint of washout.

The graphics resolution is the same as the PC's high-resolution mode, except all eight colors are available (or three shades of grey if using a monochrome monitor) at this resolution. Text characters are composed from a six by seven pixel

font on an eight by eight pixel background. Although this should make the characters harder to read, the larger size of the pixels compensates for this very well.

Installation

The MBC-550 supplied for review was the 555-2 model, meaning it had two double-sided floppy drives. Versions with one or two single-sided floppy drives, or one double-sided drive, are available. It also has 256K-bytes of RAM, the maximum available. The operator's guide explained how to connect the monitor and keyboard to the system unit, and detailed what expansion options were available.

Because the connectors on the backplane are clearly marked, and the manual is profusely illustrated,

novice users (the obvious market for this machine), would have less trouble getting it up and running than they would the PC.

Operation

Only if there is a disk in drive A will the system respond on power-on. The screen displays the video RAM addresses (apparently the result of a cold-boot diagnostic routine), the input/output system version number, the number (and names) of the physical drives, and the MS-DOS 2.1 sign-on message. Any auto-executing file is run, if present. Booting is fast, unlike the eternal delay of the PC.

The floppy disk drives are quiet and, although faster than the floppy drives of most PC compatibles, seem to be only a little faster in data



Top: The front of the MBC-550, showing that there is no room for expansion slots.

Left: A smaller keyboard with a more conventional layout still offers ease of use.

LOW-COST COMPATIBLES

transfer than half the speed of the PC's floppy drives. Although the machine runs MS-DOS 2.11, some of the standard Microsoft files are missing, notably CONFIG.SYS, so there seems to be no way of increasing disk access speed by using the BUFFERS batch file command.

The keyboard feel is not as positive as on the PC and, although the same type of DIN socket is used in both machines, the PC keyboard does not work at all on the Sanyo. The reset key is difficult to reach, but this makes it difficult to hit accidentally. There is no keyclick at all.

The whole keyboard is sloped and scalloped, with the back row of keys sloping steeply towards the front for easier touch-typing. Since only a little pressure is needed to transmit a character, touch-typing is a little dangerous.

To duplicate some two-key commands the Sanyo must use three-key commands because there is no Alt key. The conversion of PC commands to MBC-555 commands is detailed in the operator's guide.

The color monitor is much better than the PC's, in spite of the reflections on the screen. The colors are richer and stronger: even the dark blue shade does not disappear into a black background as it does on the PC.

Little explanation of the graphics system is given in any of the manuals. One page in the operator's guide mentions that any 16K-byte page of the 256K-bytes of main memory can be used for the actual display, but does not say how it can be selected. Instructions for using the MBC's color/graphics are in the Basic manual, and are only usable when writing programs in Basic. The interrupt routines are given in the operator's guide, but are not much use unless you like writing in assembler (which is not provided).

Text and graphics generation seem slower than on the PC, although the difference is not significant. The higher resolution of

the color graphics more than makes up for any tardiness in operation.

One interesting point is that the MBC-550 sign-on message lists four floppy disk drives. Although none of the manuals mention the possibility of expansion, the ROM routines are provided for the addition of at least two external drives.

One interesting feature of the MBC-550 is that the system clock has a habit of not working when the disk drives are being accessed.

PC-compatibility

All the software works well, and the MicroPro packages customised for the MBC-550 also work on the PC (including the optional color selection in WordStar). PC versions of Palantir and The Word Plus also worked properly, but a copy of OfficeWriter did not.

While Sanyo Basic is similar to Microsoft GW-Basic, it will not run on the PC. The MBC-550 will read from and write to PC disks, and the PC can also read from and write to MBC-550 disks.

While the MBC-550 is missing some PC features, it is obvious that programs which use only operating system calls should run as well on the MBC-550 as they do on the PC. None of the manuals explain how the MBC-550 handles color graphics, but it has been claimed that many PC graphics programs will run quite well on the Sanyo system.

None of the PC sample graphics programs would run, and neither would demonstration programs for Microsoft Word and Microsoft Project: the MBC's demonstration program would not run on the PC.

Overall, the MBC-550 has some compatibility with the PC, at least at the disk format level, and probably for most text-based programs. Whether it would be worthwhile learning new key combinations for those PC programs that make heavy use of the Alt and function key combinations is a matter for the prospective user.

UNDER THE COVERS

The two most obvious hardware differences between the PC and the Sanyo MBC-550 are the size of the system unit, and the keyboard. Because there are no expansion slots (and because Sanyo chose slimline floppy disk drives), the MBC system unit is significantly smaller than the PC's, which makes the whole computer system a more compact package.

The arrangement of the keys on the MBC-550 keyboard is much better than on the PC, except for the absence of an Alt key. The LEDs on the shift lock and graphics keys are useful, but the absence of one on the number lock key is a mystery. Where the keyboard falls down is in the poor tactile feedback and the too-light pressure needed to transmit a character.

The interior of the system unit is uncluttered, with a lot of empty space to assist in ventilation. Servicing the motherboard is difficult, though, because most of it is obscured by the disk drives.

The actual circuitry of the MBC-550 is a marvel of design. A full 256K-bytes of RAM can be socketed on the motherboard, an innovation that took IBM a year to introduce. (Even though Sanyo copied IBM by having a single-sided single drive system as the base model, it had sense enough to realise the need for more memory to run 16-bit applications.)

The Intel 8088 processor runs at a clock speed of 3.6MHz, or 75 per cent of the PC's clock speed. Even though this does slow program throughput, it means that the slower — and cheaper — versions of the 8087 mathematics coprocessor chip can be used.

Of great interest are the four multipin sockets on the motherboard. The first, near the backplane, is for a joystick. The second, to the right as you face the drives, is for the optional serial board. Both of these are diagrammed in the technical notes.

The third, again on the right, has 34 pins, and appears to be the standard Shugart floppy disk drive connector. Since MS-DOS 2.11 for the MBC-550 is set for four drives, and since there is a hole on the backplane marked "expansion", the purpose of this connector is obvious.

It is the fourth connector that is intriguing. It has 62 pins and is connected to all the system's control and data lines. Although Sanyo has no comment about this connector or its purpose, it could be used for additional memory, communications or disk controller boards. In fact,

Sanyo Australia uses it to run an external ACT hard disk drive, and one OEM has used it for the controller of a built-in hard disk.

MF Computers of Brookvale, NSW, one of Australia's leading disk drive servicing organisations, also manufactures its own model of microcomputer. During a search for a processor board for a new model, the owner of the company decided that the MBC-550 motherboard was close enough to what he wanted to meet his needs.

In close consultation with Sanyo Australia, MF Computers has developed an internal hard disk upgrade for the MBC-550. The power supply is replaced by an upgraded Scientific Electronics model, and the system fan is relocated. Additional metalwork is done to support a Microscience 11.25M-byte 5¼in hard disk drive, using an Adaptek controller

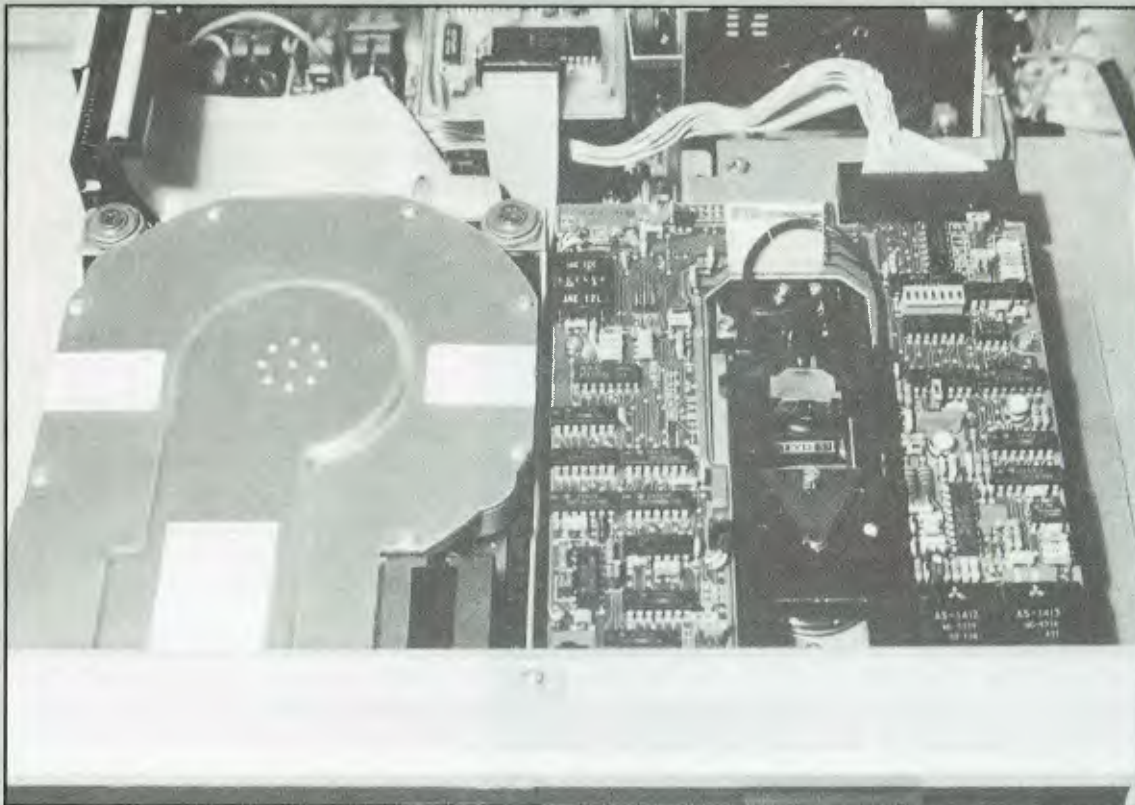
plugged into the 62-pin connector on the motherboard. The upgrade also includes a patch for MS-DOS 2.11 and a hard disk backup utility.

This upgrade is available direct from MF Computers or through any Sanyo dealer, to owners of any MBC-550 version, for about \$2995. For about \$300 extra, the 360K-byte drive can be replaced with a Teac FD-55F floppy drive, with a formatted capacity of 720K-bytes.

The addition of an internal hard disk turns the MBC-550 into a sophisticated professional personal computer that is as good as most on the market at twice the price.

Electrical Equipment Limited (192 Princes Highway, Arncliffe, NSW 2205) also offers upgrades to the MBC-550's disk drives, with four different Teac models available.

MF Computers is at 9 Ada Avenue, Brookvale, NSW 2100. Tel: (02) 939 1800.



MF Computers has replaced the second floppy disk drive with a hard disk drive, and has upgraded the power supply to suit.

LOW-COST COMPATIBLES

Software/documentation

The MBC-550 comes standard with MS-DOS 2.11 (Sanyo's version of MS-DOS 2.1) and Sanyo Basic. The DOS is highly abbreviated, missing the FIND, CREF, MASM, LIB, LINK, EXE2BIN, MORE, RECOVER and SORT commands. There is also no MODE command but, since the MBC-550 is always in high-resolution mode, this is not needed, unless you can care to engage in fancy communication tricks.

The MS-DOS manual is an unchanged reprinting of the Microsoft manual, but with the section on the Macro Assembler missing. There are no references to any changes that Sanyo may have made to the MBC-550 that will make it incompatible with the PC (there are no references to the MBC-550 except on the binder of the manual).

It seems unlikely that the MBC-550 will respond correctly to the ANSI escape sequences: there is no ANSI.SYS file or CONFIG.SYS file on the system disk. A copy of the PC's CONFIG.SYS file was accepted, but including ANSI.SYS as a device caused the MBC-550 to collapse. How relevant the MS-DOS documentation is to the MBC-550 is therefore a matter of conjecture.

The Sanyo Basic seems similar to GW-BASIC, with additional emphasis on the VIEW and WINDOW commands. There are no obvious differences between the two, except those that take into account the permanent high-resolution graphics mode of the MBC-550. Sanyo Basic also includes SYMBOL command —possibly useful for creating sprites, as well as better key programming commands

and the ability to read the screen position of the cursor.

Lacking from Sanyo Basic are the commands that handle the tree-structured directory of MS-DOS 2.1, the cassette port (and other communications facilities), and the SCREEN and DRAW commands. There is no EDIT command in Sanyo Basic, because any use of the cursor keys automatically invokes a full-screen edit mode.

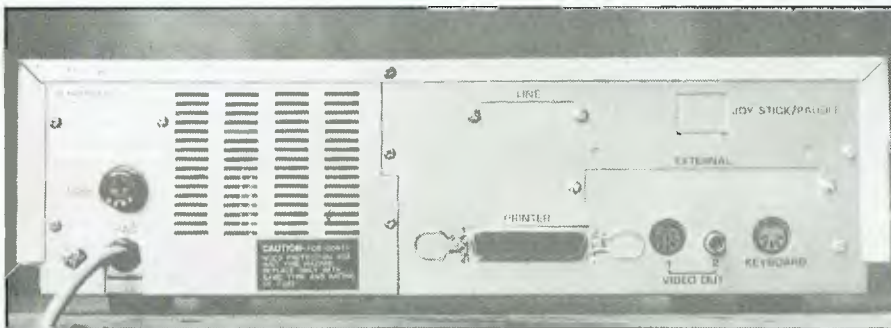
The manuals supplied with the standard MBC-550 are a big improvement on those that were supplied with the MBC-1000 and MBC-3000 systems. They are well-written, readable, and reasonably complete. Each is in its own ring binder, about the same size as PC documentation (but no slipcase).

Although the MS-DOS manual is an exact copy of the Microsoft original, the Sanyo Basic and Operator's Guide manuals are Sanyo's own. The former is replete with typographical errors, poor English and often inadequate explanations, but is still one of the better Basic manuals. Its major lack is a table of screen control escape codes, so if you are used to using your own customised routines for screen handling you will be a little lost.

The Operator's Guide is a good concept poorly executed. It contains more than enough information for the average user who is running only third-party software, and removes any need for such a user to even open the other two manuals. Unfortunately, Sanyo also attempted to make this manual the technical reference manual and only succeeded in providing enough technical information to tantalise the average hacker but not give satisfaction.

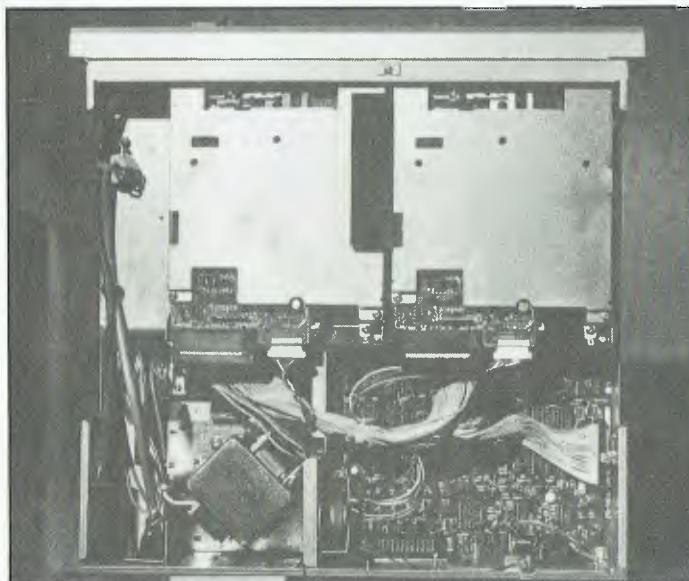
On the plus side, the Operator's Guide is clear and concise, and does give the necessary information needed for a user to swap between the PC and the MBC-550 without too much difficulty.

If you have the urge to spend



Top: Backplane of MBC-550, showing the external expansion options.

Right: With two drives (top) installed, most of the motherboard is obscured. Power supply is at bottom left.



about \$900 or more, Sanyo will sell you customised copies of MicroPro's WordStar, SpellStar, MailMerge, CalcStar and InfoStar. This is excellent value no matter what personal computer you are running (and since they all run as well on the PC, they might be a good investment if you already own a PC).

The WordStar is version 3.3. Although Sanyo has incorporated support for its color monitor (you can alter the menu color, or the text color, or both, for foreground and background), they have not taken advantage of this version's best feature: memory-mapping. Although the MBC-550 has what appears to be a memory-mapped display, the Sanyo version of WordStar 3.3 does not take advantage of it, and still subjects the user to the slow screen scrolling that is a major annoyance when you are looking for a particular page in a long file.

Another problem with Sanyo's implementation of WordStar is that the amount of text file kept in memory is still far too small. This factor, when the slow disk access is taken into account, makes using Sanyo WordStar a slow process.

The other MicroPro packages are, as far as I can tell, unmodified from the originals, except for changes to take advantage of the 8088's addressing range. CalcStar, for example, will accept a spreadsheet of about 135K-bytes (considering its slow loading speed, the user might die of old age before a spreadsheet that size finished its journey from disk to memory).

The manuals for the additional MicroPro packages are exact copies of the current MicroPro documentation, which means they are well written, profusely illustrated, and designed to make even the most novice of users happy. The user guides are in separate binders to the reference manuals, which in some cases may have been a bit of overkill by Sanyo.

Support

Sanyo's support of its computer products has never been the best. Although the technical staff are willing and able, they are spread too thinly, and the first source of help for the in-trouble user has to be the selling dealer. If you do have to deal directly with Sanyo, it is comforting to know that they have the experience and the competence to solve most problems quickly.

One advantage held by Sanyo is that it has a national dealer network as well as having its own offices in each State capital.

Conclusion

The basic MBC-550, with one single-sided disk drive, 128K-bytes of RAM, a parallel port, color and graphics but no monitor, MS-DOS 2.11 and Sanyo Basic, retails for \$1495. A built-up version, with twin double-sides disk drives, 256K-bytes of RAM, parallel and serial ports, MS-DOS and Basic, color, graphics and a monochrome monitor, is only \$3316. A similarly configured PC without color and graphics is still more than \$5200, making the top-of-the-line Sanyo a bargain.

The Sanyo MBC-550 is an excellent machine. It is no racehorse by any stretch of the imagination, but it is professionally designed and constructed. It offers the advantages of a low price that belies its high quality, a small footprint that will not overpower your desk, low-cost but good-quality customised software, enough PC-compatibility to guarantee it will not be an orphan in the marketplace, and a full complement of professional features that will suit most potential users.

If the PC is a bit too much for your needs, but a home computer is too limited, or you need PC compatibility, the Sanyo MBC-550 is a good alternative at an excellent price. It is possible that it is all the personal computer you will ever need, whether you want it for business or pleasure.



Sanyo MBC550 series

CPU:

Intel 8088 (3.6MHz)

Memory:

128K RAM; expandable to 256K. 8K ROM.

Disk Drives:

One or two 160K 5¼in, or one or two 360K 5¼in floppy disk drives. Optional internal hard disk (non-Sanyo).

Interfaces:

1 parallel port; 1 serial port optional; 1 joystick port optional.

Keyboard:

Detached with 85 keys.

Display:

25 lines by 80 characters monochrome or color; 640 by 200 pixel monochrome or color graphics.

Weight:

11kg without monitor.

Operating System:

MS-DOS 2.11

Software:

Sanyo Basic; any PC software that does not make hardware calls; customised MicroPro software.

Price:

\$1495 (base model with one 160K-byte floppy disk drive, 128K RAM, color and graphics, parallel port, no monitor).
\$3316 (twin 360K-byte floppy drives, 256K RAM, parallel and serial ports, color and graphics, monochrome monitor).

Distributor:

Sanyo Data Systems Ltd,
127 Walker St, North Sydney,
NSW 2060.
Tel: (02) 929 4644.

Pan⁺tek CAF PC-16

...the acceptable alternative!!!



- ★ 128/256 K-byte Main Memory
- ★ INTEL* 8088 (4.77MHz) Processor
(optional 8087 Co-processor)
- ★ MS-DOS* (2.11)
- ★ 360K-byte 5¼in Slimline Drives
- ★ 10Mb Hard Disk (optional)
- ★ Parallel Printer Interface
- ★ RS232C/Modem Interface
- ★ 5 Expansion Slots

...the cost effective IBM* compatible

The PANTEK CAF-PC-16 is the acceptable alternative to the IBM PC. It's loaded with standard features — like its on-board parallel printer and RS232 ports, dual slimline 360K-byte disk drives and mono display adapter card . . . and it is COMPATIBLE. Add to all this the remarkably low cost of the PANTEK PC and you have the best "value for money" PC package available today.

We also offer a wide range of optional features . . . such as an in-built 10 Megabyte hard disk, the Intel 8087 co-processor, memory expansion and local area networking facilities. Whatever you need in a personal computer, PANTEK CAF-PC-16 should be your choice.

Seeing is believing. Call us today. Not only will we explain why the PANTEK PC is the best buy . . . but we will also show you just how compatible it really is.

DEALER AND CORPORATE ENQUIRIES WELCOME

Pan⁺tek

PANTEK AUSTRALIA PTY LTD

43 McCubbin Street, Burwood, Vic 3125. (03) 288 6651

*MS-DOS is a registered trademark of Microsoft Corp.

*IBM is a registered trademark of International Business Machines Corp.

*INTEL is a registered trademark of Intel Inc.

Concurrent Windows—Two Views

Concurrency
— is it really
worth waiting
for? Peter
Harris looks
into CCP/M-
86 with
Windows and
finds it a
pain to use!

For some time, Concurrent CP/M-86 has been recognised as the most sophisticated operating system available for use on the IBM PC. It provided the ability to simultaneously run a number of tasks on the PC with only one keyboard/screen. In the right circumstances this ability produced major savings, especially in small businesses where it can significantly increase operator productivity.

At the northern autumn Comdex show in Las Vegas, Digital Research issued a pre-release of Windowing CP/M-86, the latest version of Concurrent CP/M-86. This pre-release was followed up in January 1984 with the production version known as Concurrent CP/M-86 Release 3.1 with Windows, then the April update to version 3.1, which is the package being reviewed.

Earlier versions of Concurrent CP/M-86 suffered from one annoying fault which caused many people to ignore it as a viable operating system. One of the items of information on the status line (line 25) provided a continuously displayed time of day. The screen video was momentarily turned off during the updating, causing an annoying flicker once every second. Digital Research claimed this was caused by a hardware limitation of the IBM PC and provided a "fix" to remove the flicker — by removing the status display completely.

Unfortunately this also eliminated essential status information. In the Windowing version of Concurrent CP/M-86, an allegedly insoluble hardware problem has been fixed.

Windowing CP/M-86 was tested on an IBM PC with 320K-bytes of memory, two diskette drives, a

graphics color adaptor and a 16-color RGB Princeton graphics monitor. Testing consisted of some two weeks of intense applications running with programs such as WordStar 3.35 and dBase 2.4, together with some user-written assembler programs designed to test the efficiency both of concurrency and of the disk accessing.

Windowing CP/M-86 appears to be a greatly refined version of Concurrent CP/M-86. The major new feature is the ability to optionally divide the screen into subscreens, each subscreen being attached to an executing task and providing a real time display of the output. Other new features include a new Basic Disk Operating System (BDOS), a SETUP program and a PRINT utility. The CCPM.SYS file occupies 92K-bytes as opposed to 102K-bytes for the previous version of Concurrent CP/M-86 with XT support. In fact, the BDOS and BIOS of Windowing CP/M show a greater similarity to CP/M Plus for 8-bit machines than to the previous BDOS for Concurrent CP/M-86.

As with CP/M Plus, deblocking is now done in the BDOS instead of the BIOS. As CP/M-86 uses a track cache technique for disk access, a test program was written to gauge the relative effectiveness of the I/O techniques. Results of running the test program with Windowing CP/M-86, previous versions of Concurrent CP/M-86 and CP/M-86 are shown in Figure 1. Listings of two test programs are shown. It is interesting to note that random reading is considerably faster with Windowing CP/M-86, whereas the opposite is true for sequential writing. This speed of sequential writing could be

CCP/M-86 WITH WINDOWS

considerably improved by using a system function call to set the multi-sector input/output count to 128. This technique requires that a 16K-byte direct memory access buffer be set up within the program, thus increasing efficiency at the expense of complexity and size. Multi-sector I/O is used both by the operating system for loading programs and by the PIP utility. In both circumstances the speed increase is about three times. Neither WordStar nor dBase II appeared to use multi-sector I/O. This indicates that there has been major rewrite of both the BDOS and BIOS.

To test the multi-tasking efficiency of Windowing CP/M-86, I initiated concurrent assemblies of two identical 1007 line programs. With full list outputs being created, the first assembly finished in 5:45 minutes and the second in 5:54 minutes. When the two assemblies were run sequentially from one console, total time taken was 5:38 minutes — actually resulting in a slight saving! As all files were on one floppy disk, there was considerable contention for the diskette and, from my experience with other operating systems, I was expecting a far worse result. These results actually show that Windowing CP/M-86 overlaps disk accessing with processing, which makes for reasonably efficient concurrent processing.

Additional features

Windowing CP/M-86 has an automatic log-in facility to handle the

changing of diskettes. Gone are the days of having to run DSKRESET when changing diskettes. However, I found that I had to press <Ctrl> C in order to correctly read a new diskette format. This use of <Ctrl> C is undocumented. A print spooler called PRINT is also provided, although it ran in foreground mode on one of the virtual consoles.

I found no way to detach the print spooler from the console so that I could use the virtual console for other tasks. The print spooler appears to use the interrupt capability when printing files, but this was not consistent with the significant slowing down of the system when printing on a serial printer. The print spooler is allocated the normal priority of 200 when it is initiated and there is no way of changing this. There is also no way of passing extra files to the print spooler while it is running.

Unlike previous versions, an assembler is not provided as part of the package. You can buy this as part of the Programmer's Pak package. In addition to a relocating assembler RASM-86, this package includes SYSTAT which provides a display of the state of the system. This display can be continuously updated on the screen if required. You can select an overview of status information, a display of memory allocation, a display of all processes or user processes, a display of queues or a display of information on the virtual consoles.

RASM-86 appears to be a complete rewrite of ASM-86 with the

addition of relocating facilities. There are a number of minor and major syntax differences between the two. ASM-86 ignores the underscore character in variable names whereas RASM-86 treats the underscore as being significant. Where the [BP] form of addressing is used and no explicit segment prefix is used, ASM-86 generates the default SS addressing, whereas RASM-86 generates an explicit CS over-ride prefix even though there is no segment prefixing specified. I found that I could correct this by specifying an explicit SS over-ride to the assembler. In this case, RASM-86 generated an instruction without any segment over-ride, thus assuming the default SS relative addressing. This difference in syntax actually generates different code with quite different actions when the same source code is assembled with the two assemblers. I attempted to assemble four different programs which had been working perfectly. In no instance have I been able to get these to assemble correctly under RASM-86. There appear to be major problems with the handling of calculation of displacements in conjunction with the use of the BP register. Not only are incorrect addresses generated, jump instructions are generated with incorrect relative addressing.

I have now sent in two software performance reports to Digital Research and abandoned RASM-86 in favor of my old ASM-86 which appears to work perfectly under Windowing CP/M-86. The Linker and Library Manager supplied with

Performance Comparisons

	Windowing CP/M-86 3.1	Concurrent CP/M-86 CP/M-86 1.0	CP/M-86 with QUADDRIVE
Sequential Write of 2488 records	2:31	1:09	1:59
Random Read	1:20	4:01	3:52

Figure 1: Test program results.

RASM-86 conform to a subset of the Intel relocatable object format standards. The object file format produced by the Lattice C compiler under Concurrent CP/M-86 is compatible with the Intel standards but cannot be handled by the Digital Research Linker. My last gripe with RASM-86 is that it doesn't time and date stamp print files. As Windowing CP/M-86 includes an excellent mechanism for time and date stamping disk files, it is difficult to see why Digital Research omitted a similar facility with print files generated by their own programs.

Default function keys are now assigned by Windowing CP/M-86 and there is no need to run FUNCTION on startup to assign defaults. These defaults may be specified with the SETUP command after running the FUNCTION program to assign new values.

Two programs, WINDOW and WMENU, are supplied for setting up and manipulating windows. After booting the new system diskette for the first time, I ran the demo program as instructed. What resulted was a truly dazzling display of changing windows with different background and foreground colors for each window. One program was running on each virtual console, each accessing a portion of the screen referred to as a window. The window for the virtual console in use was highlighted with a special border.

WINDOW and WMENU are essentially two alternative ways of setting up and changing windows. WINDOW is a utility which allows you to make changes to your CP/M windows by entering command lines, whereas WMENU is a menu-driven utility using the status line as a menu. It also allows you to use the arrow keys on your numeric keypad to work with your windows. WMENU can be effectively used when running a program from the same virtual console.

Each window on the screen is defined by up to 11 attributes:

- A number corresponding to the virtual terminal allocated to the window.

- PRow is the row placement point for the upper left hand corner of the window on the physical screen.
- PCol is the corresponding column placement point.
- NRow is the height of the window.
- NCol is the width of the window.
- VRow is used for scrolling the displayed window on the virtual console.
- VCol is used with VRow to define the co-ordinates of the point on the

I have now sent in two software performance reports to Digital Research and abandoned RASM-86 in favor of my old ASM-86.

virtual console which will correspond to the upper left hand corner of the window. Thus, each window can be moved around to view different parts of the virtual console.

- Tracking allows you, when sizing a window or changing a window's view, to keep some portion of the row with the cursor on it in view.
- Display refers to which display adaptor — color or monochrome — is used for display. With both the color/graphics card and the monochrome card installed, you have a total of two physical screens to which you can assign your windows.
- FGColor refers to the default foreground color of characters on a color display. It should be noted here that, if you are using a monochrome display on a color board, you will receive extremely disappointing results with all color displays, as Windowing CP/M does not contain a facility for turning off the color burst signal.
- BGColor refers to the default background color of characters on a color display.

Window

WINDOW has five sub-commands for handling windows. WINDOW VIEW responds with the current attributes of each of the four virtual consoles. WINDOW TOP NUMBER =n has the same effect as pressing <Ctrl> and 0, 1, 2, or 3 to switch virtual consoles. (Number can be abbreviated to N in the command.) WINDOW FULL N=n makes the specified window take up the full screen with the placement point at row 1 column 1 on the physical screen. WINDOW WRITE allows you to write the contents of any window or any virtual console to a disk file. This disk file may then be printed. WINDOW CHANGE allows you to change all attributes associated with each window definition.

Typically, WINDOW commands will be placed in a submit file which is automatically initiated on startup by placing a SUBMIT command in file STARTUP.0. The submit file which I found to be useful when running WordStar is:

```
a:sysdisk a:
clock
window change n=0 prow=1, pcol=1,nrows=
24,ncols=80,fgc=green
window change n=1 prow=2,pcol=2,nrows=7,
ncols=78,fgc=yellow
window change n=2 prow=18,pcol=2,nrows=
6,ncols=38,fgc=cyan
window change n=3 prow=18,pcol=42,nrows=
6,ncols=38,fgc=blue
ws
```

WMENU

WMENU is an interactive window manager which provides the facilities offered by WINDOW in menu-driven mode. The command WMENU initiates the window manager. Once initiated, it detaches itself from the console and the message "Win" appears on the bottom status line of the screen to show that the Window Manager is active. You can now make use of the Window Manager at any time by pressing <Ctrl> and the + key. You must press the + key on the top row of the keyboard. When the Window Manager is activated, it displays its main menu on the status line. The

CCP/M-86 WITH WINDOWS

main screen remains unchanged. Menu items are selected by moving the cursor with the arrow keys and pressing the Enter key to select the option.

Sub-menus, once selected, allow you to change the values of the above attributes. Typically, it is useful to use the Window Manager to play with the windows until they are satisfactory.

You can then run WINDOW VIEW to list the attribute settings which can then be set up in a SUBMIT file. The window manager has the additional useful facility of allowing you to make the window of the current virtual console full size by pressing <Ctrl> and . It can then be returned to its former size by typing <Ctrl> and again.

Faults and problems

During a month's testing of Windowing CP/M-86, I found a disturbingly high level of faults and

problems. I should add at this point that the Windowing features worked perfectly and were well documented. All faults were in the more fundamental areas of the operating system or utilities. Yet some of the problems are not present in CP/M-86.

When a monochrome screen is connected to a color graphics board, an unreadable display is produced because the color burst signal is not disabled. There needs to be a setup option (for example the SETUP program for CP/M-86) to enable/disable the color burst. This problem did not occur with the first version of Concurrent CP/M-86 but also appears in CP/M-86.

The power-on line needs to be made similar to that in CP/M-86. There needs to be an overall system startup sequence which is executed in a similar way to CP/M-86 before the startup sequence for each virtual console is initiated. Both an overall system start sequence and the

startup lines contained in the STARTUP.n files should allow multiple commands on the one line. The overall system startup sequence should be a SETUP option as in CP/M-86.

In a two drive system, Windowing CP/M-86 starts up with drive B logged in. I find that it is much more convenient to have the system start with drive A as the default. After disassembling CCPM.SYS, I eventually worked out how to achieve this.

The initial printer for each task is always printer 0. My printer is a Diablo 630 connected through the first serial port.

As in CP/M-86, the list output routine times out after a brief period. No fault is reported and output continues once the printer becomes ready again. When you are using a buffered serial printer such as a Diablo 630 daisywheel, this causes you to simply miss large chunks of your printout. This problem was not present in the first version of Concurrent CP/M-86.

To cancel an active program you must use the "Abort process n" command where "process" is the name of the task and "n" is the virtual terminal from which it was initiated. You may also use <Ctrl>C or <Ctrl> <Break> to stop a program in the same way as CP/M-86. <Ctrl> <Break> work identically to <Ctrl> C. It would be much better if <Ctrl> <Break> had the same effect as the ABORT command but applied to the currently running attached foreground program. To abort such a program, you must first switch to an alternative virtual console.

The PRINT spooler remains attached to a virtual terminal. Even CP/M-86 does not tie up the terminal with the print spooler. Well, at least any print spooler is an improvement over the non-existent print spooler in the previous version.

There is no mechanism to specify a priority for a program when it is initiated, or to change the priority from the console once it is running. The processor allocation algorithm is very simple. All tasks of equal

```

        org      100h
; this program writes 2,488 128byte records
; in file TEST.TXT on drive A
        mov      cl,16h ;open
        mov      dx,offset file
        int      224
        mov      cx,2488
loopy:   push     cx
        mov      cl,15h ;write
        mov      dx,offset file
        int      224
        pop      cx
        loop     loopy
        mov      cl,10h ;close
        mov      dx,offset file
        int      224
        mov      cl,00
        int      224
file     db       01          ;drive a
        db       'TEST      TXT'
        db       0,0,0,0
        rb       16
        db       0,0,0,0
        end
```

Listing 1: Sequential Write of 2488 records.

IMAGINEERING!™



Everybody's talking about integrated software, but it was 1-2-3™ from Lotus® that actually gave the phrase real meaning because they combined spreadsheet, information management and graphic functions in one simple, powerful programme.

Imagineering has joined forces with Lotus. So, how does this benefit you? Imagineering's commitment assures you of the highest standard of support and service. Our LOTUS HOTLINE gives you direct access to prompt, professional answers to all your 1-2-3 questions. Call the Lotus Hotline on (02) 212 4462.

"Lotus 1-2-3 is a key tool in our management decision making process. This package aids the

productivity of our staff and in turn ensures the bank retains its position in a competitive market" said Tony Ward, Management Technology Group, Australia Bank.

"The reason we use Lotus so extensively as an analytical tool is due to its intergration. Eventually we plan to use 1-2-3 to assist in the operations of the entire factory" said J.R. McGimpsey, Research & Development Manager, Davis Gelatine (Aust) Company.

"Because of its completeness, functionality and ease of use, we now use Lotus 1-2-3 in up to 20 divisions" said George Cartlidge, Manager, PC Information Centre, TNT Group Limited.

Lotus 1-2-3 is faster and easier to use than any other software available today and has the ability to let the human mind flourish and accomplish more than it ever has before.


The hardest working software in the world.


IMAGINEERING™
"The Art of Software"

123™

Available from all authorised IBM PC, Texas Instruments, DEC, and Wang microcomputer dealers

1-2-3 and Lotus are trademarks of Lotus Development Corporation. All rights reserved.

CCP/M-86 WITH WINDOWS

priority waiting for the processing unit are allocated the processor on a round-robin basis for up to 1/60 of a second. There is no mechanism for giving the foreground task priority over background tasks.

Some of the escape sequences for controlling the display on the screen are different from those used in CP/M-86. For example, <Esc>f disables the cursor, whereas CP/M-86 uses <Esc>n to achieve the same result. No reason is given for the lack of uniformity.

Although Windowing CP/M-86 keeps track of the date and time, none of the Digital Research programs make use of this feature. It would be extremely useful if, for example, the assembler and the compilers produced the date and time in the heading information in the listing.

There is still no support for other than 64 directory entries on a diskette. If you are using time and date stamping, there are only 48 available file directory entries. If you are using password-protected files as well, the number of directory entries reduces to 24. If you are using volume labels, this finally reduces to a maximum of 23 file directory entries. This number of available entries is ridiculously small and I kept on running into this limit when using Windowing CP/M-86 in a typical business environment.

There is no support for 10-sector diskettes on the IBM PC. Digital Equipment Corporation supports them in the Rainbow 100. Digital Business Systems supplies a field installable device driver (FIDD) for Windowing CP/M-86 to cater for 10 sector diskettes.

There is no support by Digital Research for 96 tracks/in diskette drives. For Concurrent CP/M-86, I prefer to use the Digital Business Systems QUADDRIE FIDD driver. This package replaces the disk driver in Concurrent CP/M-86 and allows for the intermixing of 48 tracks/in and 96 tracks/in diskettes in a 96 tracks/in drive and for the intermixing of 48 and 96 tracks/in drives. As a fringe benefit, it allows for 10 sectors per track, and on a 96

```

                org     100h
; this program reads 100 random records
; three times from 2488 records
; in file TEST.TXT on drive A
                mov     cl,0fh ;open
                mov     dx,offset file
                int     224
loopy0:         mov     cx,100
                mov     si,offset records
loopy:         push    cx
                cld
                lodsw
                mov     rec_no,ax
                mov     cl,21h ;random read
                mov     dx,offset file
                int     224
                pop     cx
                loop    loopy
                inc     times
                cmp     times,3
                jnz     loopy0
                mov     cl,10h ;close
                mov     dx,offset file
                int     224
                mov     cl,00
                int     224
times          db      00
file           db      01      ;drive a
               db      'TEST   TXT'
               db      0,0,0,0
               rb      16
               db      0
rec_no         dw      0000h
               db      00h ;not used
records        dw      2320,12,18,256,23,800
               dw      52,563,622,700,5,421
               dw      33,1256,1876,600,63,2100
               dw      2307,156,700,1800,345,2409
               dw      389,323,844,379,1534,1123
               dw      1178,856,689,1294,927,2309
               dw      1234,2300,159,765,381,555
               dw      564,1400,1900,482,231,890
               dw      235,194,2489,1200,267,1400
               dw      2482,1304,301,629,88,2189
               dw      1105,45,785,214,984,659
               dw      2357,1238,291,1890,361,142
               dw      56,895,1652,854,456,861
               dw      1598,527,1385,485,1349,1342
               dw      65,842,1653,1249,2302,584
               dw      125,982,238,1405,589,1362
               dw      589,621,56,2138
                end

```

Listing 2: Random read of 300 records.

tracks/in diskette gives a storage capacity of 800K-bytes, all with the IBM supplied disk controller board. On the large capacity diskettes, 256 directory entries are provided.

The method for connecting a FIDD appears to be different for Windowing CP/M-86. I reassembled RAMDISK (one of the sample FIDDs supplied by Digital Research) after changing the test for the correct version number. It didn't work because, apparently, the interface is different. No documentation was provided on the new FIDDs interface.

According to Arcom Pacific the FIDD interface is no longer supported.

The BIOS routines for calling a FIDD routine are incorrect. The parameter to indicate the required function (reading, writing and so on) is passed in A>. Unfortunately, although this parameter is set by the BIOS, it is overwritten before the FIDD is called. A relatively easy patch fixed this.

There is no function call to obtain a flag. In previous releases, this was implemented by a semi-documented non-standard interrupt. This interrupt still appears to exist, but no longer returns a flag with the same calling sequence as in earlier releases. No documentation was provided either on this interrupt or on obtaining flags.

There is no way to issue a wait on one of a number of flags. A programmer must either use queues or initiate multiple subtasks. These are extremely complicated ways of doing a simple task. A function call should exist which will allow for a list of flags to be passed to the BDOS, with the return being made when any one of them has been set.

The SYSTAT program produces a rather annoying display of a moving cursor when blanking out the screen. It would have been a relatively simple matter for Digital Research to turn off the cursor in SYSTAT.

The Graphics System Extension (GSX) package is now supplied as part of Windowing CP/M-86. GSX supposedly provides device-

independent graphics. On the older CP/M-86, it supports plotters such as the Hewlett-Packard 7470. On Windowing CP/M-86, hard copy plotting routines are only supplied for Epson-type printers. Support for the Plantronics video board has also been deleted but, on the plus side, support for the Mouse Systems "mouse" has been included. Bill Bolton of Arcom Pacific (DRI's Australian distributor) has advised that the graphic device drivers supplied with CP/M-86 work with Concurrent CP/M-86. I have not yet been able to check this but, if it is correct, why aren't they supplied with Concurrent CP/M-86? In any event, support of the HP-7475 working in the same mode as a HP-7470 on A4 paper but with six pens is not supported under either CP/M-86 1.1 or Windowing CP/M-86 3.1.

The fixed disk support for the XT worked according to specification. However, there appears to be a serious design flaw, in that archiving is limited to the standard PIP utility. I have not been able to find a way to archive files larger than 320K-bytes. As many XT systems are bought for just this reason, this alone may deter many XT owners from using CCP/M-86.

Unlike PC-DOS there is no easy facility for dumping the contents of the screen to a printer, in either character or graphics mode.

The <PrtSc> key does not print the screen, but functions in the same way as <Ctrl> P, by toggling printer output.

The dayfile option of MP/M-86 is provided as a standard feature of Windowing CP/M-86. This feature lists on the console the name of each command and the time of day it is started. As the name of the task is shown in a more convenient fashion on the status line and the time is also shown on the status line, the dayfile option merely results in a cluttering up of the screen. There should be a setup option to turn off the dayfile.

For some strange reason, system function call 3 ("raw console input") is not used at all now. Although the

same function may be achieved by setting specific parameters with Function 6, you will have to patch the object code of any affected distribution programs you own to use the different function. There is no documentation outlining the changes between this release and earlier releases.

The documentation for the generic version of Concurrent CP/M-86 states that "it is highly recommended that the OEM supports the advanced features of Concurrent CP/M-86, including time and date stamping, in the Format program". In this respect, Digital Research did not even heed its own advice. DSKMAINT does not allow for formatting for time and date stamping. It does not allow for the creation of volume labels and it does not allow for insistence on password protection.

The release of DRGraph supplied from Arcom Pacific was 1.01. Neither the documentation for Windowing CP/M-86 or DRGraph supply instructions on how to run GSX, which is included with both Windowing CP/M-86 and DRGraph. This is essential if you want to run DRGraph under Windowing CP/M-86. The total documentation supplied for GSX with Windowing CP/M-86 amounts to seven lines in the release notes. If you want to find out that one can terminate GSX with the GRAPHICS NO command, you will have to buy the Programmer's Pak.

The DRGraph manual states that you have to have 192K-bytes of memory and CP/M-86 to run the package. Application Note 1.0, in seven lines, gives the instructions for running under Concurrent CP/M-86. No mention is made of how much memory is required under Concurrent CP/M-86, what releases are supported or whether you should use the Graphics command from the DRGraph distribution diskette or the Graphics command from the Windowing CP/M-86 distribution diskettes. In any event, on a 320K-byte system, with no memory drive set up, the command "RUN GRAPH" refused to work with either

CCP/M-86 WITH WINDOWS

version of GRAPHICS.CMD. It simply gave a LOAD ERROR. After spending \$50 phoning Digital Research, they advised that 320K-bytes of memory is probably insufficient for DRGraph.

Australian support

A limited amount of support for CCP/M-86 is being provided in Australia by Arcom Pacific, the master distributor for Digital Research in this country. This is a welcome development and may result in increased use of the product in Australia.

This support is still, however, in its early stages. In the US, Digital Research offers professional programmer support for \$US250 a year. A similar facility in Australia would be a worthwhile improvement in service. Digital Research has a very reasonable update policy in the US compared with vendors of competing operating systems. Users of Release 1.0 paid \$US40 to update to Release 3.1 and are being offered the PC-DOS support update free. Arcom Pacific is yet to announce its update policy.

Summary

Concurrent CP/M-86 with Windows appears to be based on inherently sound concepts. The window facility cannot be faulted and is well documented. But, as with all complex software products, there are the inevitable teething problems together with a significant number of needless design limitations.

As you will have gathered, most problems with this program could be fixed with a relatively simple SETUP program similar to the SETUP program for CP/M-86. How about it Digital Research? Both CP/M-86 and Concurrent CP/M-86 reserve track 0 sectors 2-4 for this information.

By the way, if you press the "?" key during the loading process you will be told that "Much of this code is bought to you by Dean Ballard".

The loader is a considerable improvement on previous loaders from Digital Research. It is a general-purpose loader capable of loading either CPM.SYS or CCPM.SYS. The loader looks for CPM.SYS, which is the system file for the CP/M-86 operating system. If it finds it, it loads CP/M-86. If it doesn't find it, CCPM.SYS (the Windowing CP/M-86 system) is loaded. Unlike CP/M-86, neither CPM.SYS or CCPM.SYS have to be in specific locations on the disk.

Whether Concurrent CP/M-86 will gain a measure of acceptance in the market will largely depend on the

availability of applications programs. Although CP/M-80 was the industry standard for the 8-bit world, PC-DOS has far surpassed the popularity of CP/M-86 for the 16-bit world and is now the de-facto industry standard. This is apparently why Digital Research will soon be releasing the PC-DOS support feature.

Without the ability to run PC-DOS applications, CCP/M-86 has only limited usefulness in the IBM world. Because of this, the success of CCP/M-86 will largely depend on the effectiveness of its soon to be released PC-DOS support.

ARCOM PACIFIC'S BILL BOLTON REPLIES . . .

Concurrent CP/M with Windows is primarily a product for end users. As such it is supplied with a set of utilities useful for end users. The sort of system utilities that program developers need is available in an optional Programmer's Pack.

As business end users don't need an assembler package or sophisticated system status utilities such as SYSTAT, these are not included to keep prices down. The Programmer's Pack includes a full assembler program development system interface documentation, source code for the window manager and extra technical information on accessing the screen.

It is never necessary to press <Ctrl>C after changing disks with Concurrent CP/M with Windows on standard IBM PC hardware on the first access. I have used both ASM-86 and RASM-86 to assemble many programs and I have never found any incompatibilities. The source code uses most of the features of the 8086 instruction set.

Lattice has never claimed that the output from its C compiler is compatible with Digital Research's LINK86 linker, so it's not surprising

that LINK86 may not handle it. The color graphics board is primarily designed to provide color information on screen. It is hardly surprising that there is color information on the composite video output. I tried several brands of monochrome monitors connected to the composite video output of a PC color graphics adaptor and had no problems in reading the displays.

A specific "overall" system startup sequence is not needed as any necessary system startup procedures can be placed in the STARTUP.O file. Only one command is needed in a startup file as this command is normally a SUBMIT command to execute a batch file. STARTUP files are provided for each virtual console so that individual consoles can have specific startup sequences if necessary. The one line STARTUP files can be easily changed with an editor or even using PIP.

When Concurrent CP/M with Windows boots, it logs on to the "highest" numbered disk (normally the B: drive) as the system disk on a floppy disk only system. On an XT system which has had

the fixed disk set up with a CP/M partition, the system disk is normally the "lowest" numbered fixed disk.

A command called SYSDISK is provided with the operating system to reset the system disk to any other disk in the system at any time. Concurrent CP/M with Windows supports a memory disk as disk M: if the user desires and has sufficient memory, and the M: drive can also be made the system disk if needed. The SYSDISK command can be included in any batch file run from STARTUP.O if the user wants to have the operating system to use a different system disk after boot. In any case, in an XT system, which is the most common business system configuration, it is desirable to have the operating system boot up logged into the hard disk (which is normally the B: drive), so this is the default situation.

The initial printer assignment can also be altered with the PRINTER command to whatever the user wishes at any time without the need to patch the operating system. The PRINTER command can also be made part of a batch file run from STARTUP.O.

The ABORT command is a powerful feature of CCP/M. It allows "stalled" tasks to be aborted. One reason CCP/M provides such excellent isolation from unwanted interaction between concurrent tasks is the real-time kernel which has been developed over several years through MP/M. Many multi-tasking operating systems provide no mechanism at all for aborting a stalled task.

Concurrent CP/M with Windows already has the ability to execute four tasks at once, which is probably as much as you should reasonably expect a single 8088 to handle without further CPU help. Under these circumstances, there is no point in making the PRINT utility detachable from a console. If it were detachable it would mean five tasks would be running, which is just too much for a single 8088 while

retaining acceptable performance.

Concurrent CP/M with Windows still allows a user to have three other tasks running concurrently with a print spool task.

The priority of a task may be set

Resources are allocated on an interrupt, priority and time-slice basis, not just as a simple round-robin basis. There are 256 priority task levels.

in the file header for that task and a program may dynamically change its own priority. Since all four windows operate concurrently, an integrated application program may adjust the priorities of its different modules. Digital Research did extensive market testing before determining the default priority settings. It found

it was confusing and dangerous for users to be allowed to arbitrarily reset the priority of tasks. The setting of priorities should be left to the applications program designer, and there is good support in the operating system programming interface to allow programmers to manipulate priority levels as they see fit.

Concurrent CP/M with Windows is a real-time operating system. Resources are allocated on an interrupt, priority and time-slice basis, not just a simple round-robin basis. There are 256 possible task priority levels.

There are some minor and trivial differences in the escape sequences between CP/M-86 and Concurrent CP/M with Windows. These are due to the inherent differences between a single task operating system and a multi-task operating system. Most escape sequences, including all major screen-handling functions are the same across both operating systems.

Few users will take the trouble to set the date and time of day on each system boot (CCP/M is no more successful at this than PC-

NEW!

Paper Tamer

PRINTER ORGANIZER

suits all Matrix Printers using 210mm (A4) paper



- "Paper Tamer" saves space and restores order to your desk top micro-centre.
- Neatly stores up to 900 sheets continuous paper under the printer.
- Allows perfect input paper feed and collects out-put efficiently in special tray.
- Manufactured from **sturdy** white colour coated steel rod.
- Excellent value for money.

NEW in Australia NOW available direct from Supplier

Lintek

23/243 Ernest St., Nth Sydney, NSW 2060
Telephone (02) 929 3271

Please rush me PAPER TAMERS. I enclose \$39.95 plus \$3.00 freight and packaging for each.

Name _____ Address _____

☐ CHEQUE ☐ MONEY ORDER ☐ BANKCARD

Signature _____ Expiry Date _____

If I am not fully satisfied I may return goods within 30 days for full refund

CAS0031

If you want to talk to a computer talk to CASE.

Once you're involved in the ever-widening world of **data communications**, it's not long before you come across the name, **CASE**.

In just two years, we've become the fastest growing supplier of computer communication and terminal equipment in Australia.

And for the reason which makes a successful company grow – **commitment**.

Commitment to excellence in our product range and to the support we provide our customers.

But, at **CASE**, we have another "plus".

We supply **everything** that's needed to make data communications work for you. Terminals. Modems. Multiplexers. Concentrators. Error Correctors. X25 Products. Data Switching and Network Control Systems. **Everything but the computer itself, and the telephone lines.** (And we work well with them, too.)

So, no matter what you're operating – a multi mainframe network, a mini-computer system or a single micro – there's a CASE product you can confidently use for **every** application.

THE CASE RANGE

MODEMS – for error free transmission.

Asynchronous or Synchronous operation, short or long distance, 300 bps to 72,000 bps. CASE modems have built-in error correction plus auto-dial and auto-answer facilities for dial-up applications and ultra high speed 16,000 bps operation for leased TELECOM circuits.

MULTIPLEXERS AND CONCENTRATORS – for economic line usage.

Whether your system is large or small, synchronous or asynchronous, CASE multiplexers offer dramatic savings on a simple point-to-point link supporting 2 terminals or a complete multi-node network supporting 2000 devices.

The DCX **multinode switching multiplexer** is the ultimate in networking concentrators, providing **auto-re-routing, load balancing, port selection, contention, protocol conversion and X25 interworking.**

DATA SWITCHING – for efficient resource allocation.

Our **DSX** provides **port selection, contention and fallback switching in a single upgradeable product line.**

Whether switching terminals between computers; allowing a large number of terminals to contend for a smaller number of computer ports; or switching terminals to a back-up computer, CASE, has the right solution at the right price.

X25 PRODUCTS – for cost effective packet switching systems.

The economical way to build your own X25 network; or connect into Austpac or other packet switching systems. Range includes **Packet Switches, Multiplexers and PADS** together with network testers and **X25 simulators.**

LOCAL AREA NETWORKS – for immediate connection.

Grapevine allows you to use the local area network you have already installed – your internal telephone network – to **interconnect terminals, micros and mainframes** without interfering with existing voice communications or PBX functions.

GO-BETWEENS – for today's data communications network.

Australia's widest range of **code translators, speed interpreters, buffers, access controllers, error correctors, protocol convertors, encryptors, data adaptors and intelligent interfaces.**

If you have any problem at all in data communications, or you'd like more information on CASE products, phone us now:

**Sydney (02) 451 6655.
Melbourne (03) 529 7644.
Brisbane (07) 221 4727.**

Or take a moment to complete the coupon below.



TERMINALS – for user friendly input.

The fully ergonomic range includes Data General, DEC and Prime emulating models.

CASE's special custom mode – can simplify repetitive functions – such as automatically dialing-up and logging you on to your computer system – with a single keystroke.

PRINTERS – for fast output.

An unmatched range of **matrix and daisy wheel** printers including the **PT930 Dual Mode Printer** (its quality and quietness will astound you) and our **120 cps Gemini 10** (its price will amaze you.)



CASE

CASE COMMUNICATION SYSTEMS LIMITED

FREE CASE pocket book of computer communications.

If you want to talk to a computer talk to CASE.

To:
CASE Communication Systems Ltd.
1-3 Rodborough Road, Frenchs Forest, NSW 2086.
Please send me, free of charge, a comprehensive CASE Catalogue plus a 'Pocket Book of Computer Communications'.

Name

Company

Position

Address

Postcode Telephone

CCP/M-86 WITH WINDOWS

DOS in this respect). If Concurrent CP/M with Windows does not have the time of day set into it, it simply starts from 00:00:00 at boot time and provides an elapsed time clock display on the status line.

To maintain media compatibility with previous releases of CP/M-86 and Concurrent CP/M-86 for the PC, Concurrent CP/M with Windows supports 64 directory entries on floppy disks. As the capacity of the standard IBM double-sided floppy disk under Concurrent is 320K-bytes, 64 directory entries is more than adequate for normal use. Even when time and date stamping is used, the 48 available directory entries are still more than adequate for typical business usage on 320K-byte floppy disks.

There is no point in using passwords on floppy disks as they can be physically removed from the machine and the files examined with a disk dumper and so on, at leisure on another machine at a different site. Passwords only make sense on fixed disks and Concurrent CP/M with Windows provides a choice of 1024 or 2048 directory entries on an XT fixed-disk system to ensure there is plenty of directory space to accommodate both time/date stamping and passwords. A typical business environment would not run out of directory entries on a floppy or hard disk under Concurrent CP/M with Windows.

Support for 10-sector disks and 96 tracks/in drives are not supported by Concurrent CP/M with Windows for the same reasons they are not supported by IBM — reliability.

There is no longer any support for flags (which was why it was documented as non-standard in previous releases) and that is why it is not documented. Using queues instead of flags provides an infinitely more flexible mechanism for controlling real time event-dependent processes.

The HP-7475 plotter is a relatively new graphics device. It will be supported in the GSX graphics

drivers supplied with Concurrent DOS. The GSX device driver library is continually updated to cover popular new graphics output devices as they become available. Graphics applications products such as DR Graph come with a range of GSX device drivers that work fine with Concurrent CP/M with Windows and include plotter drivers.

As the Window manager command menu may be present in

There is no point in using passwords on floppy disks as they can be physically removed from the machine and files examined with a disk dumper.

the status line, instead of the standard status information, at any time the user chooses the dayfile feature of Concurrent CP/M with Windows does provide useful information.

The previous release of Concurrent CP/M, Version 2, didn't support system (BDOS) function call 3. This call in single-user environments was used for a reader or auxiliary I/O device, but makes no sense in a Concurrent environment.

There is no extra or specific documentation needed to use DR Graph under Concurrent CP/M with Windows. The documentation for Concurrent CP/M with Windows says that instructions for using GSX will be supplied with graphics applications packages. The DR Graph documentation includes explicit instructions on how to load GSX. DR Graph runs correctly in a 320K-byte PC under Concurrent CP/M with Windows.

Concurrent CP/M with Windows

is capable of loading large memory model programs such as DR Graph directly, without the need for the RUN utility.


I cannot duplicate Peter's problems with loading DR Graph with any version of the GSX Graphics program under Concurrent CP/M with Windows.

Concurrent CP/M with Windows for the PC and PC XT has been tested by Arcom Pacific and is known to run on the following systems: PC1, PC2, Portable PC, PC XT, Corona (with IBM graphics card), Compaq, Olivetti M24 and Sperry PC. Users report that it also works on Columbia and some Eagle models.

Concurrent CP/M with Windows doesn't work on the Dick Smith Challenger. In general, if a personal computer is close enough to an IBM PC configuration to boot and run an unmodified IBM PC-DOS disk, it will run Concurrent CP/M with Windows.

Concurrent CP/M with Windows is a reliable operating system with no "rough edges". It is aimed at typical business users. Most of Peter's problems stem from his non-standard hardware and his preconceptions about making Concurrent CP/M with Windows look like the older, single-tasking CP/M systems he is familiar with.

Several useful features of Concurrent CP/M with Windows that support standard hardware configurations of the PC have not been covered in the review, such as the memory drive support, 8087 availability attributes for files, XT fixed disk operation and so on.

Concurrent CP/M-86 with Windows has already sold in large numbers to PC users in Australia and is a proven commercial product which delivers what it claims. 

Concurrent CP/M-86 with Windows.

Arcom Pacific
252 Abbotsford Rd
Mayne, Qld 4006. Tel: (07) 52 9522.
Price: \$290.

More Memory... and Multi-Tasking!

The latest entry in the PC RAM-cramming stakes offers half a megabyte! Ian Robinson puts the Addram Plus through its paces.

There appears to be a continuing game of one-upmanship among the various manufacturers of PC memory expansion boards regarding the maximum single-board RAM capacity. The earliest boards, including the official IBM Memory Expansion Option, were content to offer 256K-bytes; if anyone was crazy enough to want more, they had to buy another board. But those were the days of 8-bit thinking, when anything greater than 64K-bytes seemed too greedy to be useful, and before the marvels of super-programs and integrated software arrived on the scene.

Then the PC software avalanche began, with memory-gulping products like Lotus 1-2-3, and the PC RAM expansion race was well and truly on. No sooner had several leading multifunction card manufacturers begun selling their 320K-byte boards when Quadram announced a 384K-byte model. As if this was not enough, we are now faced with the most recent addition to the plethora of PC expansion boards, the Addram Plus, which has a maximum single-board expansion of 512K-bytes!

There are practical limits to this madness, however. The PC memory map will allow only 640K-bytes of contiguous user RAM. The physical dimensions of RAM chips and PC expansion boards are also a limitation, as can be seen in the photo of a fully-populated Addram board. It would be very difficult to squeeze in any more banks of dynamic RAMs, because a certain amount of additional controlling circuitry is always necessary.

The PC architecture is such that

extra RAM chips must always be added in banks of nine, one for each of the eight data path bits, and one for a parity check bit. This applies both on the motherboard and expansion boards. Therefore most add-on memory expansion cards will have sockets for some multiple of nine dynamic RAM chips. In the case of the Addram Plus, this results in a total of 72 sockets, bringing the memory capacity up to 512K-bytes, as each of the eight banks of nine chips gives 64K-bytes of RAM memory. In addition to all this memory, within the few square centimetres of real estate remaining, a real-time clock/calendar and two serial ports have been squeezed in as well.

Addram hardware

One unusual feature of the Addram board is its end panel, which contains a standard 25-pin male connector, as found on the majority of RS232C serial ports. Directly above this is another RS232 serial port, but in this case a 9-pin connector is used. This is a neat trick, as only nine pins (at most) are used in serial communications, and two standard connectors will not fit side by side on a PC end connector. This is why most other boards with more than one port tend to hang the others off the end of a rather unsightly piece of protruding ribbon cable.

The real-time clock/calendar chip keeps track of the time and date, and is kept alive by the on-board battery backup. A special utility program sets the clock. The clock and calendar functions are then

integrated into PC-DOS, where they may be accessed by the usual commands.

Installation of the Addram board is a fairly painless procedure, with the manual providing considerable hand-holding, if required. Subsequent changes to memory size or serial port parameters are simplified by the implementation of DIP switches and jumper connectors.

Tascmaster software

The Addram Plus comes into its own when combined with the powerful Tascmaster software, supplied with the board. This is provided in addition to the customary print spooler and RAM-disk software, which seem to be standard equipment on most current PC multifunction boards.

Invoking the Tascmaster software provides a true multitasking facility, which represents a great advance over the majority of PC multifunction boards. Up to nine tasks may be running concurrently, and the user may toggle between the various tasks, simply by using the <Alt> key in conjunction with the number of the task. For example, in Task 1 you could be editing the source code of your latest Pascal program, while the previous version compiles in Task 2, and the version before that is being printed out in Task 3. Of course, if you had all nine tasks running concurrently there would be a noticeable drop in speed for all tasks, but this situation would be highly unlikely in a single-user environment. The feeling is similar to that of driving a sports car — it's reassuring to know that you can push the limits if you want to, but you must be prepared to face the consequences if you do.

The RAMSPOOL program creates a buffer for parallel printers of up to 64K-bytes in length, predefinable in increments of 1K-byte. Commands exist to remove, redefine, or empty this buffer at any

time. Individual buffers can be created for any number of printer ports. The SPOOLSER option performs a similar operation for serial printers.

The RAMDISK program creates one or two virtual disk drives in memory, which offers a potential speed increase of up to 50 times for disk-bound programs, and is fully integrated with the Tascmaster software. Drives can be specified up to 320K-byte capacity, and are best set up at initialisation time, via an AUTOEXEC.BAT file. RAMDISK2 is a modified version for PC-DOS version 2.00 (and above), which takes advantage of the installable device drivers feature.

Documentation

Two reference manuals are supplied with the Addram Plus. They are a hardware installation booklet and a collection of pages that make up the software operations manual. Both are in the standard PC documentation format, which allows them to fit neatly into the appropriate section at the rear of the PC Owners Manual.

The reproduced pages appear fuzzy in some places and fade out in others, but the overall standard is higher than that of many competing products. The installation guide is detailed, containing a full description of every DIP switch setting and

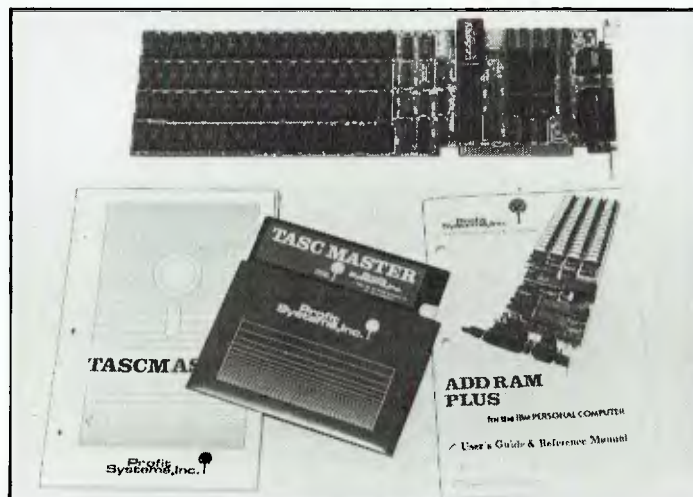
every jumper on the board. The pinouts for both the 9-pin and the standard 25-pin connectors are also described.

Where from?

The Addram Plus is manufactured in the US by Profit Systems Inc, a well-established PC add-on board supplier, and distributed in Australia by Hospital Computers Pty Ltd. It appears that the already crowded PC add-on hardware market still has room for further contenders such as Profit Systems, whose title sums up the obvious motive. The Addram Plus is available for a base price of \$895 (with 64K-bytes installed) including sales tax. The 64K-byte upgrades (a nine-chip set) are available from diverse sources, ranging from electronics component distributors to PC dealers, at a similarly diverse range of prices, so it is often worthwhile to shop around. If you are the nervous or non-technical type, however, it is probably best to buy a board with the required number of chips already installed and save yourself the worries of inserting them. **PC**

Hospital Computers Pty Ltd

86 Kareena Road,
Miranda, NSW 2228.
Tel: (02) 526 9101.



Fully-populated
Addram Plus board
with software
and manuals.

SYMPHONY

in Integrated Software

Lotus' new product is a complex work in five movements. Harry Miller decides if it is a masterpiece.

Symphony is impressive in its tremendous range of features and functions. It has a great deal of raw power for a single program. But is that power presented in a useful way? Do those features meet the needs of the people who are most likely to use the program? How does Symphony compare with standalone packages that perform the same functions?

This exploration of a beta-test (pre-release) version of Symphony points to some answers.

The most difficult part of using Symphony is getting it set up. Once you've got all the basics defined, using the program will be relatively easy. However, establishing a working environment for each of the applications is not a trivial task and could easily overwhelm the weak of heart. One important trick is to figure out which ranges of the worksheet have to be defined before you can start each application. In the course of defining those ranges, you'll want to map out the worksheet and restrict each application to a discrete area.

Overture

Symphony's spreadsheet is deceptively large. Lotus 1-2-3's worksheet is among the largest available, and Symphony's is four times as long. It is ironic that, because the Symphony program code takes up about 265K-byte of memory (compared to Lotus 1-2-3's 112), you'll end up with less work space than you had before, unless you can add memory to your computer.

As a result, the real capacity is

considerably less than the 256 columns by 8192 rows on the worksheet seem to indicate. For example, on a machine with 512K-bytes of RAM, we filled all 8192 rows of each column in succession with a number, then with a text string (label), and then with a formula. Using the number (12345), we ran out of memory when we got to the end of the column G; using the label (abcdefg), we got as far as the bottom of column B; using the formula ($A1/A1*A1 + A1-A1$), we could only fill column A. When we set up a very plain sample database, we found that the real limit was about 2000 records, each containing name, address, city, state, postcode and phone number fields. These informal tests only reveal part of the problem. Symphony hasn't improved on Lotus 1-2-3's relatively inefficient method of reserving memory by using blank cells. If you enter some data at a remote cell location (somewhere towards the bottom right corner, for example), Lotus 1-2-3 and Symphony reserve memory for all of the space between that cell and the upper left corner (cell A1).

This situation has direct implications for your system requirements: if you want to take full advantage of the integrated applications environment (and to do so you'll want to map out the worksheet with discrete areas for each environment and window), you'd better have as much RAM as you can get. Even then, none of the applications you want to integrate can be large. It may seem strange, but if I had a lot of spreadsheet data to manipulate, I'd rather use Lotus 1-2-3.

My opinion is that restricting all of the program code and data storage to what can fit into RAM is a mistake. It seems that a judicious use of overlay files or virtual memory swapping would yield a freedom from limitations that would more than outweigh a slight decrease in performance. An optimum design would allow all of the work to be performed in RAM until the limits were reached and then call on some disk storage technique.

Spreadsheet

Lotus 1-2-3 is among the most powerful spreadsheet programs available. Symphony builds on Lotus 1-2-3's capabilities and adds some useful features. The most notable additions are password protection and hidden cells that limit access to certain parts of the worksheet, a Range Table command that lists existing range names with their corresponding ranges, and a Range Transpose feature that copies a range of data and swaps row and column entries (to change the orientation of a table of data). The Copy command has been upgraded to copy only the current values of the specified source cells (not the formulas), if that method is desired.

The date arithmetic is improved greatly by the addition of an @DATEVALUE function that finds

the date value of a text string or label. Also, the time arithmetic functions should allow timed automation of some operations. For example, at 5am it could call Dow Jones, get the quotes for the stocks on the list, and send the results in the form of a memo to a distribution list.

Other new additions include

If I had a lot of spreadsheet data to manipulate, I would rather use Lotus 1-2-3 than Symphony.

logical functions to determine the type of entry in a cell (@ISNUMBER, @ISSTRING, @ISERR, @ISNA) and functions to manipulate text or character strings (@ASCII, @CHR, @FIND, and so on). Symphony handles text in a more adept manner than does Lotus 1-2-3, and some of the methods of handling long labels that are used in the word processing environment seem to

have rubbed off on the rest of the functions.

Word processing

Once you adjust to doing word processing on a spreadsheet, and once you get used to creating a document out of a series of long label entries, the DOC provides an easy-to-use and reasonably flexible foundation for producing letters, memos, or medium-size reports. The combination of the "what-you-see-is-what-you-get" nature of the full-screen editor and an acceptable layout and use of the keyboard commands enables you to create documents easily.

The DOC window is simply a blank screen with a format ruler at the top and an indicator line that describes the cursor position and formatting parameters that are in effect. The display screen is kept clean by a hidden current page location. You can access this handy bit of data at any time by pressing the <Alt> - <F2> "Where" key.

Special print characteristics are controlled in a manner similar to that of WordStar. You press <Ctrl> -B (for begin) to indicate the start of an attribute (such as boldface or italics), and the program displays a triangle. You then press another key to specify which attribute, and at the end of the text string to be treated you place a

Interval between successive tab stops		MENU
Tab	Justification	Spacing
3 Tab interval:	5	
3 Justification:	1	
3 Spacing:	1	
3 Left margin:	1	
3 Right margin:		
3 Blanks visible:	NO	
3 CRs visible:	YES	

Document Settings for window MAIN

Figure 1: Document format setting sheet.

<Ctrl> -E (for end); the program responds by displaying an inverted triangle.

It is tricky at first to put two or more documents in windows at one time. Doing so allows you to view two documents side by side and to cut and paste blocks of text between them. To succeed in this manoeuvre, you must specify appropriate "restrict ranges". If the document you're working on is less than 80 columns wide, you can simply set the column width to 80 and restrict the DOC range to a single column. If you're careful to keep the restrict ranges unique, you can define many windows, each holding a separate document.

If you don't restrict the range of the DOC window, there will be a significant delay in the screen response since the entire spreadsheet is redrawn or recalculated whenever new DOC text is inserted.

The underlying spreadsheet structure provides a high level of interaction between spreadsheet data, data captured over the phone line or from the database, and a word processing document. Besides the mail merging capability that you would expect from a combined word processing and data management program, you can take advantage of the communications function to tie the word processor to an electronic mail system or to have immediate access to any incoming communications document.

The ability to include spreadsheet data in a word processing document such as a memo or a report is a definite benefit. You can even make the spreadsheet data dependent on data from other parts of the worksheet and thus have it change whenever the worksheet is altered. The problem with this system is the method it requires to move a block of data or text from a SHEET environment window or location into a document. It's reasonably easy to get the data into the document by copying or moving it in, but then it

becomes SHEET data and is therefore not easily edited from within the DOC environment. And when you're in the SHEET environment, you can't edit text created in the DOC environment. Further, the documentation — at least in its early version — doesn't explain how to change the status of a block of text or data to make it accessible from the current mode (that is, to enable editing of "non-

The documentation doesn't explain how to change the status of a block of text to make it accessible from the current mode.

document" text in the document environment). The recommended answer is simple, if inelegant: to import spreadsheet data into a DOC environment window, you "print" it to a range within the document. That's a solution that would be hard to guess — it goes against my intuition about how programs should work.

The formatting features offer a very acceptable level of flexibility and control. The ruler line and format menu permits selective control of margin and tab settings: right (even), left, centreing, justification, and line spacing (see Figure 1). A document can have many ruler lines so that the format can be changed for small blocks of text if necessary. Format lines can be named and saved for later use with other documents.

Another notable feature is Symphony's ability to name, store, and merge any number of boilerplate paragraphs for use in

multiple documents. These blocks of text can be stored as separate files or held in a part of the present document. Commonly used simple phrases can also be stored as keyboard macros.

The justification feature works adequately. It reformats automatically but not annoyingly. Rather than proportional spacing, which assigns a different amount of space to each character, adjusting space to create an even right margin, Symphony's justification feature uses the coarse method of inserting spaces between words.

The centreing function is controlled by the justification feature, and therein lies its weakness. To centre a line of text, you have to create a new format ruler with justification set to "centred". That means a lot of keystrokes for a simple task — another good candidate for a keyboard macro.

The line-marker feature works well. It enables you to assign a name to a specific line in the text, so that the name can be used with the GOTO key to jump back and forth to a specified location. Since the line-marker names are stored with the worksheet file, you can easily create two macros to take advantage of this feature: one would assign a standard name to where you left off before you saved the file and quit the program ({MENU} FLA:leftoff~R), and the other would goto that standard-named line-marker to pick up where you'd left off ({GOTO} leftoff~).

A nicely implemented speed-highlight feature allows you to specify the end of a range to be highlighted by simply typing the last character in the block. When you type a character, the highlighting is extended to the next occurrence of that character.

Communications

The COMM environment includes a full-function communications program. For the most part,

Symphony's COMM environment will perform asynchronous communications as well as do most standalone packages. Data can be captured directly onto the worksheet or into a DOC window. To capture communications data in a DOC window in usable form, you have to define the capture range as a single column large enough to accommodate the longest line sent from a remote computer. Just as easily, data can be sent directly from a worksheet range to a remote computer.

The software also provides auto-dial and auto-logout capabilities as well as auto-answer. A full range of transmission parameters, the phone

number, and, optionally, the full login sequence (user name, password, and the remote host's responses) for each commonly used remote computer site can be stored in a Setting Sheet that can be specified, activated, and executed with a few keystrokes. Symphony supports the XON/XOFF handshaking protocol, which you can enable or disable with a selection on the Setting Sheet. The sheet can also include any specifications for terminal emulation that are necessary for the remote host you are using. Most standard ANSI-type terminals are supported, including the DEC VT-100. The program even lets you store the

amount of time you want it to spend trying to connect to any given host before it gives up.

In addition, the Setting Sheet (see Figure 2) stores the location of the "capture range" on the worksheet. The process starts with establishing and naming a Setting Sheet (a .CCF file) for each remote site. Some of those parameters (the capture range, for example) can be altered in the middle of a communications session. A session can also be temporarily suspended to allow spreadsheet analysis of the incoming data.

Once you select a capture range, subsequent communications sessions are appended to the

Speed and type of transmission										MENU			
Interface	Phone	Terminal	Send	Break	Handshaking	Capture	Login	Name	Quit				
Interface		Terminal											
Baud:	1200	Screen:	WINDOW			Response:	\j						
Parity:	Even	Echo:	NO			EOL:	\m						
Length:	7	Linefeed:	NO			Delay:	0						
Stop bits:	1	Backspace:	BACKSPACE			Break:	60						
Phone		Wrap:	YES			Handshaking							
Type:	TONE	Delay:	0			Inbound:	YES						
Dial:	60	Translation:				Outbound:	YES						
Answer:	15	(none)				Capture:							
Number:						Range:	NO						
						Printer:	NO						
										Communications Settings:			
Set send/receive string for B										MENU			
Maximum-Time	Repeat-Time	A	B	C	D	E	F	G	H	I	J	Zap	Quit
Count	Send (maximum time 0)											Receive (repeat time 0)	
A 1	{RETURN}											Please enter your user name:	
B 1	pcworld											Password:	
C 1													
D 1													
E 1													
F 1													
G 1													
H 1													
I 1													
J 1													
										Login Settings:			

Figure 2: Communications setting sheet and login sequence.

bottom of the range, as you'd hope, rather than starting at the top of the range each time and overwriting the previous session.

The complex configuration of the telecommunications environment in part makes possible its innate power and potential. When combined with some keyboard macros to form a menu system, the communications features can be made extremely easy to use in day-to-day operations; when combined with the time arithmetic and command language programming features, this program holds the potential to be among the most automated communications systems available for the PC. But although the complexity makes this possible, it will also certainly keep successful communications just out of reach for many average users. That same laudable automation requires that you learn to program in Symphony's command language.

The great weakness of the COMM environment is that it greatly favors communication between the worksheet and the remote site. Disk file transfer in either direction requires the Xmodem error-checking protocol. While that protocol is reasonably popular among microcomputer users, it is not at all common on larger host computers. Thus, to transfer a file from the disk to a remote host that doesn't support Xmodem, you have to import the disk file into the worksheet and then send it out — an inelegant solution at best.

Data management

The data management function probably best displays the advantages and disadvantages of performing all functions in a spreadsheet format. While the spreadsheet format provides a good visual comprehension of the table format that is the conceptual foundation of most databases, it also limits the number of records and the number of characters per field (255 is the limit of characters per cell).

Although it's a perplexing business, moving back and forth between the FORM environment to create the database layout and enter the data, and the SHEET environment to do all the manipulations (searching, sorting, extracting, editing, and so on) turns out to be an effective means of managing data in small to medium-size chunks. In addition, the data management function is more than

You'll have to go through several iterations of misunderstanding before useful reports come flying off the printer.

adequate for simple day-to-day file management tasks. Its features included edit check (for validity — that is, that the data entry falls between a prespecified range of values), automatic establishment of a simple input form, and a sophisticated but simple query-by-example system.

The FORM environment is very usable for data entry and retrieval. Once you've created a list of fields in the SHEET environment, Symphony creates a data entry form with the fields listed down the left side of the screen with underscore characters indicating the length of the field. That form could easily be edited in either the SHEET or DOC environment to make data entry as convenient as possible. The only limitations are that the whole entry form must fit on one screen and that each field must be contained on a single line; that is, several fields can share one line, but no field can spill

over to the next line. As you move through the fields to edit the database and add new records, user-definable data entry prompts are displayed on the command line at the top of the screen. Those prompts, along with other attributes connected to each field, are stored on the worksheet in a "definition range" and can easily be altered in the SHEET environment.

Symphony also automatically creates an input and criteria range just below the definition range. In theory, this would enable you to proceed immediately to use the database application. In practice, you'll have to go through several iterations of misunderstanding before useful reports come flying off the printer. For example, you'll first have to specify sort keys, output ranges, and report forms. For every choice Symphony automates, you can rest assured that there will be two more choices you'll have to decipher and make.

In some categories, Symphony's data management facility is limited in comparison to standalone packages, and in other areas it compares favorably. For example, searches in Symphony allow wildcard parameters (such as * to mean all of a type, ? to mean any character in that position, and ~ to mean "all but" the specified type) and compound search criteria (up to 32 fields). And the query-by-example criteria are easy to specify: you just use the criteria range to enter the items you want matched. As in Lotus 1-2-3, searches and sorts are performed very quickly. In addition, Symphony's calculation capabilities would be hard to match in a standalone database management program.

Symphony uses a reasonably powerful report generator that allows sophisticated field computations and calculations (including database statistical functions such as average, maximum, minimum, standard deviation, and variance of records that match a certain set of criteria) in the data management reports.

The report forms can include form letters, mailing labels, invoices, and lists, among others. You can design report forms by creating and editing them in a DOC or SHEET window.

Symphony allows multiple databases in a single worksheet and an unlimited number of entry, query, and report forms per database. Of course, as with the DOC environment, great importance is placed on restricting ranges to keep separate databases in separate areas of the worksheet.

Graphics

The GRAPH environment is a sophisticated analysis graphics facility. Its features and functions are essentially the same as those contained in Lotus 1-2-3 with the addition of an extra graph type (high-low-close-open). The other major difference between the two is the windowing feature: with Symphony you can display two or more graphs simultaneously on the same screen, or you can display a graph next to the data it represents or with a text explanation in an adjacent window.

One of Lotus 1-2-3's greatest inconveniences is that it requires a program on a separate disk to create printed graphs. Symphony carries on that unfortunate tradition. You create the graph on the screen and then save the image in a .PIC file to be printed later. The PrintGraph program offers excellent control of the final printed appearance. While it wasn't an issue with Lotus 1-2-3, it is disappointing that Symphony doesn't provide a way to create a hard copy that mixes text or spreadsheet data with a graph on the same page.

The process of creating a graph is in some ways made more complicated by the use of setting sheets and by the fact that you can specify the graph settings in either the GRAPH environment or the SHEET environment. If you specify the settings from a SHEET window, you can preview the graph, but you

must ultimately "attach" the graph to a window. If you work from a GRAPH window, the "attachment" is automatic.

Window management

I was ready for windows, and I hoped that Symphony's windows would be easy to use and would provide a good logical introduction to working in several environments

New users (should) refrain from using windows until you understand the operations of each of the applications individually.

simultaneously. It didn't take long before I was hooked. This article was created using several windows: the text of the article was in a DOC window called Main that more or less remained on the left side of the screen while I kept a running set of random notes in a SHEET window called Notes; a Macros window held the macros that I made up as I went along to reduce the drudgery and to work around some rough spots in the programs's design; the database was in a window called Data; and a window called Test held the temporary results of my experiments.

The spreadsheet framework provides an expansion canvas representing the RAM workspace upon which all these applications can be overlaid, each in its own window. At the same time, determining how to make the best use of all that space can be a slightly overwhelming challenge,

especially for a novice.

My recommendation for new users is that you refrain from using windows until you understand the operations of each of the applications individually as well as the method of movement around the worksheet. Once you have a better idea of the worksheet's geography, you can start to take advantage of the windowing capability to display several sections of the worksheet simultaneously and to move from place to place, and application to application, more easily.

Macros and programming

Lotus 1-2-3 introduced keyboard macros to spreadsheet software, and they have become a standard feature of spreadsheet or integrated programs. Symphony extends this feature with a Learn mode, an extended number of macro names to assign, and a command language that includes some of the features you'd expect from any programming language.

The Learn mode operates in a manner similar to that of ProKey. When you start the Learn mode, any keystroke you perform until you turn the mode off will be recorded in a "learn range" that you've previously defined. Symphony stores learned keystrokes in the format required for keystroke macros, with special keys surrounded by brackets (for example, {HOME}). That learn range can then be assigned a range name and executed as a macro. For a complex operation this method is a sweeping improvement over furiously keeping track of keystrokes with pencil and paper in preparation for writing a macro.

The {F7} "User" key broadens the base of possible range names that can be used for macros. By pressing {F7} and typing a range name, you can execute the macro stored in that range. As you do, a "User" indicator displayed in the lower right corner of the screen is replaced by the range name you type.

When reading the documentation on the command language, you almost get the feeling that programming is what Symphony is about — that all of the applications are really just resources for the programming language.

A macro program written in the command language consists of a series of statements, each beginning with a command key word. Keystroke sequences that have been "learned" or typed in manually can also be included in the programs. The key words access the computer's resources (for example, {BEEP} sounds the computer's bell), access the data in the spreadsheet (as in the {LET} command, which stores a label or a number in a specified cell), and access Symphony's operations (for example, {PANELOFF} suppresses the redrawing or flickering of the control panel while a macro is being

executed, and {INDICATE} lets you specify a short text string to be highlighted and displayed in the upper left corner of the screen). The language provides facilities for subroutines, branching, IF logic, assignment of values to variables, and loops.

The potential for automation of the applications is almost mind-boggling. Programmers will have to learn a new syntax and grammar, but conceptually the Symphony command language provides many of the same resources and possibilities as Basic.

Integration

A major objective of Symphony is the creation of an integrated applications environment where data can be easily transferred between applications. To a great extent this data integration is the reward for

using the spreadsheet as the common structure to which other applications are forced to comply.

On the other hand, as data is passed to and from the DOC environment, the ease of integration that you'd expect falls away. It seems as if the degree of effort that is required is not much less than the effort required to import a file from an unrelated application. In some instances I found that it was not the level of effort that was the barrier but rather the counter-intuitiveness of design. There are some data interchange procedures you'll just have to learn by rote, because you probably won't be able to follow the program's logic.

For example, when you set a column width, the new width is in effect only for the window and environment under which it was defined. If you have a DOC window in column A, and you switch to the

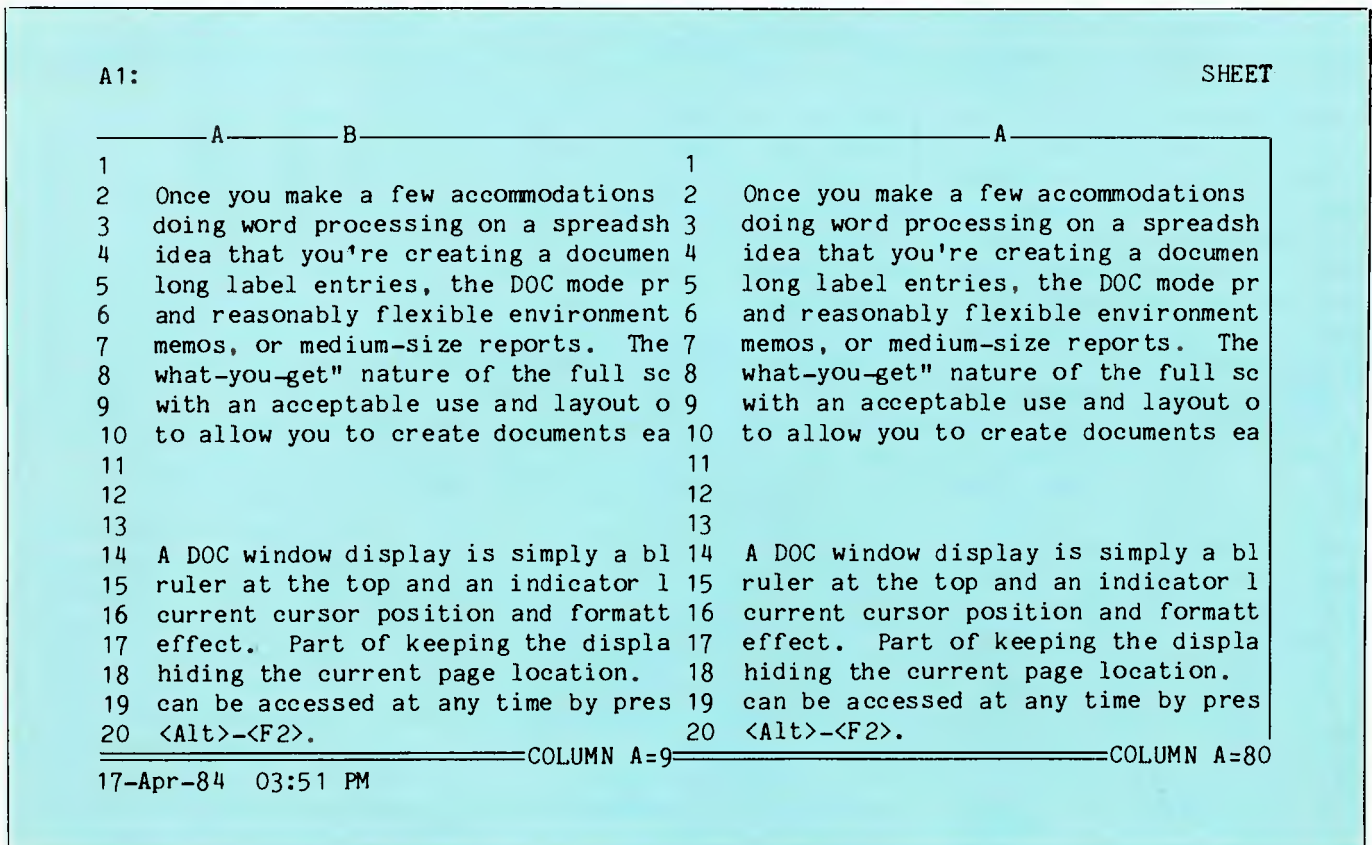


Figure 3: Any area of the worksheet may be formatted differently in separate windows.

SHEET environment to define that column to be 80 characters wide and then change (with the <F6> "Window" key) to a COMM window to transmit the document in that range, you'll be surprised to find that only the first 9 characters are transmitted. That's because in the COMM window (or in any other window except that single DOC window) column A still has its default column width of 9 characters (see Figure 3).

Another form of integration involves the degree to which the commands and basic functions are similar in each of the five environments. Symphony does as well at this as can be expected for a program that switches modes. The Services menu (accessed by pressing the <F9> key) is constant regardless of the mode, and the changing menu of application-specific commands is accessible from the <F10> "Menu" key.

Documentation

It really wouldn't be fair to evaluate Symphony's documentation based on the early version we had to work with. However, there are a few indications that the final manuals won't be the tools you'll need to gain comprehension and control of the program. The manuals suffer from their unusually large size. In part the size is due to the ambitious scope of the program, but whatever the cause, it's a lot of reading.

The documentation comes in two parts, a how-to manual and a reference manual. Neither one stands very well on its own, and I found myself flipping back and forth between the two large volumes. I was dismayed at the number of times the how-to manual referred to the reference manual for a complete discussion; when I turned to the reference manual, it was hard to tell whether the lack of that complete discussion was due to the early draft nature of the document or not.

The early release of the manual also exhibits one of my pet peeves: it goes on for about 30 pages without telling you that you can exit the program gracefully by using the Services menu (pressing <F9>).

Finale

What has Lotus created with Symphony? Is it "the only software you'll ever need"? Or is it a monster of complexity that will keep you further from your goal of just getting the computer to produce some useful work?

**If the riches are
hard to get to,
only the hardest of
souls will stick
around long enough
to discover them.**

Clearly, Symphony has a fantastic array of features and capabilities. We could fill an entire issue with descriptions of each and every feature and our opinions about them. The problem is in gaining access to those features. If the riches are hard to get to, only the hardest souls will stick around long enough to discover them. While most products seek to be more intuitive and to free you from worrying about the workings of the machine or the software, Symphony forces you to do a lot of preparation before any results are possible. The implementation of Symphony's vast range of features feels like a major step backward in computing history.

Another frustration with the product stems from the fact that, given

the flexible command language and Setting Sheet design, making Symphony as easy to use as it is powerful wouldn't have been too difficult. It would have been immensely helpful if Lotus had delivered the product with a "beginner's mode" group of Setting Sheets, predefined windows with restrict ranges, and some sample GRAPH and COMM settings. It's clear that, to make the product handy, you'll want to set up macros and probably a menu system. It would have been a great help if some of those technical amenities were provided with the product. Once you'd mastered the program, you'd have the knowledge to go in and alter the Setting Sheets and window definitions to better suit your own applications or working style.

As with any piece of software, how good it is depends on how you want to use it. Don't expect Symphony to be the one program that will fulfil all of your dreams. It isn't. If you're a manager or if you run a small company, Symphony may eventually prove to be a useful tool for a large portion of your work. People whose work lives are dominated by a single type of task (writers, data entry personnel, and so on) will still require the fuller and deeper functionality of dedicated software. **PC**

Lotus Symphony

Imagineering

3/579 Harris St

Ultimo NSW 2007

Price: \$995

Requirements: 256K, two disk drives
colour graphic screen.

*Harry Miller is the Editor of the US
edition of PC World.*

Conducting the Orchestra

Dick Andersen
writes a
memo to the
directors of
ABC.

The best way to discover how Symphony works is to use its functions, singly and together, on a typical, realworld application. Suppose that I work for the chairman of ABC Development Corp and I have been asked to write a memo to the other board members discussing the performance of ABC's shares.

Using Symphony's communications function, I can call up the Dow Jones News/Retrieval service to get current quotes on ABC stock and capture the data in an area of my Symphony spreadsheet. The numbers I receive will automatically be shuttled into the memo, will update a quotes database, and will be added to and analysed in the spreadsheet. The quotes in the memo will be used as the basis for a graph.

Getting ready

As with Lotus 1-2-3, all Symphony functions use the spreadsheet as a common holding area for data. Before I start any work, I need to allocate different areas of the spreadsheet for each task.

A good way to keep track of which area does what is to draw a map of the spreadsheet, illustrating which rows and columns are reserved for which functions. For this test I set the memo area at columns A through I. Area 2, columns J through P, will hold the data captured in the communications session. The database (Area 3, columns Q through X) will hold the quotes database and other information required for forms processing.

When I first load Symphony, it automatically starts in the SHEET

environment, with a full-screen window called MAIN. The window represents a range of the spreadsheet that can be logically isolated from other ranges. (The word MAIN is displayed in the lower right-hand corner of the screen. In the upper right-hand corner the Environment Indicator displays the word SHEET.) All five possible environments — spreadsheet, word processor, graph, communications, and database — can be active in this window. I could partition the screen into five windows to monitor all these functions simultaneously. For simplicity's sake, however, I will display each environment in turn in the MAIN window.

To enter the word processing mode, I press <Alt> - <F10>, which produces the Environment Type menu, and select the DOC option. Symphony's word processor comes complete with features such as word wrap, toggling between insert and overwrite modes, paragraph reformatting, and copy, move, and erase block operations. If I press the "Services" key, <F10>, a high-level menu of DOS environment commands is displayed.

After I write the first part of the memo, I must turn to the COMM environment to get current ABC stock quotes from Dow Jones; I give the <Alt> - <F10> "Type" command again and select the COMM function. Symphony displays a blank COMM screen. The lower right-hand corner of the screen shows that I am still working in the MAIN window, though I have changed environments. (The memo remains in memory; I can retrieve it quickly by choosing DOC from the

Environment Type menu.)

I next set the capture range in the communications Setting Sheet; to establish communications with Dow Jones, I then specify the appropriate parameters (see Figure 1).

Considering the large number of public and private databases and the number of different personal computers, it is likely that Lotus Development Corp and other suppliers will eventually provide configuration files containing communications settings for all the popular services and computers.

When Symphony captures lines of text into the spreadsheet, it breaks up each line into strings of characters and places each string in a different column. The number of characters that occupy a column is determined by the width of the column. If you know the format of the data that will be received and set the column width accordingly, your data is more likely to make sense at first glance. Since I know that Dow Jones transmits quotes fields 10 characters long, I set the column width in the capture area of the spreadsheet to 10 before I start the session.

Once the Setting Sheet is complete, calling Dow Jones is a matter of flipping on the modem and selecting the Phone options from the Communications menu and the Call option from the next menu. For this test I used a Hayes Smartmodem, although any Bell 103 or 212A modem will do. Once logged on to Dow Jones, I request the most recent week's quotes for the ABC Development Corp and capture the information in columns J through P of the spreadsheet.

(ABC is a fictitious name, but the quotes used in this test are from a real company and were captured using Symphony.)

You can toggle in and out of the capture with <F4> — a handy feature if you do not want to save everything from a communications session. In this case, I only capture the actual request for stock quotes ("abc p1") and the quotes

themselves to avoid cluttering the worksheet with logon and logoff sequences.

Moving data

There are several ways of moving captured data into the memo. I could simply copy the data and implant it, but an easier and more efficient way is to display the memo, enter the SHEET environment, and insert into the memo formulas that refer to the proper cells in the communications capture area. These formulas automatically transfer the data into the memo; the next time quotes are captured, the memo will automatically be updated.

Note that column G in the memo contains formulas that calculated the per cent change in the asking price of the stock for each day (see Figure 2). This aptly illustrates that in the SHEET mode a document can be treated and worked on like a spreadsheet. This raises the issue of what is a document and what is not.

Remember the Symphony is a gigantic spreadsheet that can function in four other modes. When you enter text in the DOC environment, each line is essentially a label that starts in a column of the spreadsheet. You can enter the SHEET environment, enter additional data or formulas, and return to the DOC environment. The data

Use, Create, Delete, or Execute a named file of communications settings MENU

Interface	Phone	Terminal	Send	Break	Handshaking	Capture	Login	Name	Quit
Interface Terminal Send									
Baud:	1200	Screen:	WINDOW			Response:			
Parity:	Even	Echo:	NO			EOL:	\013		
Length:	7	Linefeed:	NO			Delay:	50		
Stop bits:	1	Backspace:	BACKSPACE			Break:	60		
Phone		Wrap:	YES			Handshaking			
Type:	PHONE	Delay:	50			Inbound:	NO		
Dial:	30	Translation	(none)			Outbound:	NO		
Answer:	15					Capture			
Number:	9,267 3764					Range:	NO		
						Printer:	NO		

Communications Settings: A:\DJNS.CCF

Figure 1: COMM environment Setting Sheet.

A1: ' March 14, 1984 SHEET

	A	B	C	D	E	F	G
1							March 14, 1984
2							
3	To:	Board members					
4	From:	Mr. Big					
5	Subject:	Latest ABC stock quotes.					
6							
7	Here are the latest company stock quotes, together with the percent						
8	change from day to day. As you can see, we're still climbing! I plan						
9	to recommend at the next Board meeting that we give additional stock						
10	options to all employees, so that they can share in the success to which						
11	they've contributed so much. The graph shows the daily fluctuations						
12	graphically. If you have any other agenda items, please get them to me						
13	by March 16th.						
14							
15	DATE	BID	ASKED	CLOSE	VOL(100/S)		%CHANGE
16	02-Mar	25.75	26.00	0	418		
17	05-Mar	27.25	27.50	0	519		5.77%
18	06-Mar	30.50	30.75	0	617		11.82%
19	07-Mar	30.50	30.75	0	3262		0.00%
20	08-Mar	31.25	31.50	0	334		2.44%

17-Apr-84 04:00 PM Calc MAIN

Figure 2: Memo with embedded share quotes.

you have just entered is "non-document" text; it can be printed, but it cannot be edited in the DOC mode. This is not a flaw in Symphony but rather a safety measure that prevents a user from inadvertently destroying valuable formulas or macros while editing a document.

To transfer the updated quotes into the database, I use the Range Values command in the SHEET environment. This allows me to convert the formulas in the memo into values and to move these values directly into the database. This useful feature has long been present in some first generation spreadsheet programs such as VisiCalc and SuperCalc.

Symphony's graphics are quite similar to those of Lotus 1-2-3, with the exception of a few new features such as High-Low-Close-Open graphs.

Once you have created a graph, you must save it with the Graph Save command (which puts it in a .PIC file), exit Symphony, and use the Print Graph utility. To generate a graph from the stock quotes in the memo, I enter the GRAPH environment, and with the Range command, I specify the location of the numbers to be graphed.

Separate windows

Up to this point I have used five environments in only one window. But there are good reasons for performing distinct functions in separate windows. One advantage is that you can monitor several functions at once. Beyond this, separate windows offer protection, since operations in one window cannot usually interfere with those in another.

It is particularly important for a document to be in a separate window. For the memo, I use the Window Create command to create a window called Memo; I make the window hug the text by restricting it to columns A to H with the Window Create Restrict Range command.

Once the memo is enclosed, I can perform block insertions and deletions within the window and not worry about affecting other areas of the spreadsheet. Without the protection of a window, changes in the memo might cause data or formulas elsewhere in the spreadsheet to shift.

Moving text is simple. If I want to place the last two sentences in the first paragraph of the memo below the stock quotes, I move the cursor to the first character of the text block and press <F10> to get the Services menu for the document environment. I choose the Move option and highlight the block with the cursor. I stop highlighting with <Enter> and move the cursor to the block's destination; pressing <Enter> again performs the move.

Integration perplexity

A question still remains: is having five programs in one integrated package all that useful? The tasks performed in this article could have been accomplished with Lotus 1-2-3, MultiMate, dBASE II, and PC-Talk III.

But with those programs it would have involved repeated disk swapping, program reloading, and the laborious transfer of data from one program to another — things most people would not bother to do. Symphony's integration of these functions means not only quicker program execution and one working style but a subtle expansion of control over information.

A word of caution: if you choose to use Symphony, you will have the power to improve your productivity in many ways. But do not come to this banquet prepared to sample all the delicacies at once. Master each environment separately before you attempt to integrate them.



Dick Andersen is director of a US consulting company which specialises in advising businesses about the use of personal computers.

AN AUSTRALIAN OVERTURE

by **RON POLLAK**

This may be deemed the Claytons review; the one you do when you don't do a review. This is because, at the time of our review, Symphony had not been released and consequently the product was not freely available for us to work with, to test and to critically analyse.

What can one do in an hour, especially with the distributor sitting at the reviewer's shoulder?

There are a number of all-singing, all-dancing software products available on the market, but Symphony is orchestrated to outdo the rest. It offers a spreadsheet, a word processor, graphics, data management and communications. Lotus claims that "this is the only software package that you'll ever need to buy."

Lotus has never spared dollars where the quality of presentation is concerned. To users, it means easy-to-read manuals, good protection for your investment, faster learning, easier use and so on.

Symphony's seven disks come protected in a hard plastic box. The softcover cardboard manuals have a flap which allows users to keep their place.

The Lotus 1-2-3 template is enhanced to cover twice the number of functions. You get the F1 to F10 keys plus a further 10 when you press the <Alt> key. Each item in itself is not significant, but together they make for a high-quality product.

This package now provides 8192 rows although, with the present memory constraints of your computer hardware, you probably will get more rows from your Lotus

1-2-3 spreadsheet than you will from Symphony. The program itself requires more than 300K-bytes!

The solution to this memory constraint is not an easy one, especially if Symphony behaves as badly as Lotus 1-2-3 when some of the operating system is overwritten (something that is highly likely with the window facility in Symphony).

The Lotus 1-2-3 screen has been redesigned. The menu selections are now in the second line with the description of the option on top. One can appreciate how important this small change is when one has seen the face of new Lotus 1-2-3 users who happen to hit the slash (/) key for the first time. With what appears to be 19 possible options facing you it can be quite daunting. The change indicates that the description line (which can be mistaken for menu options) is not available for selection; a very subtle and effective move.

A further enhancement to the screen is the constant display of the date and time at the bottom left hand corner of the screen. And just to show that the company can learn from its competitors, Lotus has introduced a Multiplan-like percentage remaining indicator on the screen. The screen we were shown indicated 99 per cent free.

Perhaps the most significant changeover is the menu structure. Already, we have mentioned there are different uses for the function keys. F10 is the same as the familiar slash key (/). Do not fret; the slash is still available and operates the same way. But once you have invoked the commands, do not expect to find the familiar menus. The Data Fill function now resides under the Range command. The F9 key invokes the services menu. Services include printing, saving, clearing (/Worksheet Erase) and graphing. All the Lotus 1-2-3 functions are still there, but the

access paths are changed. It can only be surmised that, to add on options, it was necessary to restructure for the functions to provide as logical as possible a path to a function.

Through a windowing type of function, one can easily move data from word processor to spreadsheet and vice versa. What we saw was impressive, and we feel strongly that the integration would stand a test of work volumes and conditions, not just a demonstration file. Time will tell.

The method of integrating from a spreadsheet to a word processor went as follows; complete your worksheet and invoke the word processor by depressing the F2 key. The selected worksheet data is automatically transferred to the word processor but (understandably) you lose the maths features and only bring across the solution. Change a component number and the totals do not change.

It appeared quite simple and can be done without losing sight of your data. One opens a window adjacent to the active window and moves the data between the two of them. We understand that graphs can be moved in much the same way. Windows can be opened at any time with different sizes and applications.

The word processor appeared powerful, and our only comment is that we liked the range of available font options, but were amazed that Lotus had not gone to the extent of writing the screen-handling routines that would enable them to be displayed even on a graphics screen.

From our experience, the greatest shortcoming of Lotus 1-2-3 was the lack of a simple feature to allow adding a record to a database and deleting or editing of that record through a special screen. This has been rectified with Symphony.

If you want word processing, spreadsheet, database, graphics and

communications (and we have seen many people buy Cross-Talk, a modem, Lotus 1-2-3, dBase II and WordStar) you cannot go wrong in selecting Symphony. You will also need to learn only one menu structure and to familiarise yourself with one set of programs, one screen format, and so on.

But be warned. Because of the number of features, it will take a reasonable time to familiarise yourself with the program. Many Lotus 1-2-3 users may consider trading in Lotus 1-2-3 disks and launching into Symphony. Look before your leap! Your old files can be converted, but this is done without bringing across the cell names. If you use /Range Name Create frequently you will still have a bit of reworking to do. The command performance (the method of activating the commands) is not classical Lotus 1-2-3.

The \$995 price of Symphony is low when compared with the total cost of buying a PC. It is, however, going to cut into a dealer's profits; previously he would have sold four packages; now only one. So there may be a little resistance from dealers to promote it. Nevertheless, it appears to be a good buy for a new user.

Existing Lotus 1-2-3 users will have to think carefully before plunging into Symphony. What is going to happen to all those large Lotus 1-2-3 worksheets, each with lots of named cells? And what will you do with your w/p and communications software?

We are confident Symphony is an excellent product, but we will be advising our clients to wait for us to have a better look at the program before they join the queue for an update.

PC

Ron Pollak is director of the Sydney management consultancy company Ron Pollak and Associates.

PERFECT is Excellent

Word processing is the most common function performed on a PC. William Hall finds a program which is simply excellent.

WordPerfect is the most comprehensive and powerful of all the word processing systems I have worked with to date. These include WordStar, Select, Spellbinder, MultiMate, Perfect Writer and The Final Word. Most systems have a few outstanding features — but normally these are provided at the expense of compromises in other areas. WordPerfect is comprehensively excellent. Almost every facility it offers compares favorably with the best features of someone else's package. Of those reviewed to date, only Spellbinder offers as many features, and on a feature-by-feature comparison, WordPerfect is almost always the more polished and easy to use system.

I was invited to review WordPerfect by Nelson Wheeler, the Melbourne chartered accountants, as part of a consultancy contract to select an appropriate word processing system for use in their offices and for potential inclusion in computer packages offered to their clients. I was able to work with revision 3.0 for more than one month, running on a 256K-byte IBM PC. I have also briefly used WordPerfect as bundled with the Stearns computer.

Overview

Running on the IBM PC, WordPerfect can fully utilise all formatting and print enhancement features of virtually any printer which can be connected to the PC. WordPerfect can output 256 different characters to a printer. An output character may be a single 8-bit code or a sequence of codes. The printer installation can be easily made by anyone who can understand the use of command codes provided in the usual instruction manual provided with a printer. Software configurations are provided for a range of Diablo, Qume,

NEC and Itoh printers.

WordPerfect's manual is designed for the experienced user and provides clearly detailed explanations, examples, and exercises. An operator who already understands basic word processing functions should have little trouble learning to use the system from the manual. Be forewarned, however, that WordPerfect is a very powerful and capable system that cannot be completely mastered overnight. After more than a month, I am still learning to make full use of some of its more sophisticated functions. No comprehensive tutorial is provided, and the system might be difficult for someone with no prior computer experience to learn from scratch.

WordPerfect's ergonomics are sadly affected by IBM's absurd keyboard layout, which Columbia, Fox and many other lookalikes have slavishly copied. The Stearns keyboard represents a major improvement on the PC standard. However, even given the limitations of the PC's hardware, virtually all commands are accessed via function keys clearly labelled by the plastic overlay provided for the keyboard. Transparent stickers are provided for other keys. Thus, given that the PC's ergonomics make it impossible to touch-type most commands, the labelling makes it unnecessary to memorise them either. Hence, any experienced WP operator should adapt quite easily to using WordPerfect for familiar tasks. In most cases the commands are logical and smooth enough to more than compensate for any time lost in looking for and reaching to the appropriate function key.

More than for any other system I have seen, WordPerfect's screen display truly meets the "what you see is what you get" promise. Horizontal

scrolling, tabs and other formatting functions are available to cope with line lengths of up to 250 columns. The only formatting options not displayed accurately are changes in type font, fractional horizontal and vertical spacing and the automatically formatted footnotes. Function codes and footnotes are entered into the character string but are not displayed to the screen except in the special "Reveal Fncns" mode (which allows only the most limited cursor movement or deletion). The screen display copes fully with different pitches, proportional printing, and the like — always displaying the appropriate line lengths for the current font.

For an accountancy firm, WordPerfect's most interesting feature would have to be its maths and forms handling facilities. The maths facility provides addition, subtraction, multiplication, division, averaging and summing operators. It is not able to accept data directly from other files, nor does it have any conditional functions beyond those provided by using "macros" in conjunction with searches (see below). However, working entirely within the word processing system it is possible to construct and save documents to calculate and print everything from fairly simple invoices to filling in many kinds of pre-printed forms. However, the maths functions are column and row oriented, and do not have the capability to work with uniquely specified cells as do full spreadsheet systems. I have no doubt that WordPerfect has the capability to handle virtually any straightforward accounting structure.

Three other mutually interacting functions — Merge, Macros and Search/Replace — are also able to work in conjunction with the maths functions. These provide a polished power well beyond that offered by any other system I have used. The only major feature the basic WordPerfect package lacks is a sorting or indexing function, which would be most helpful in the construction of databases for mailing lists and the like. A simple

select/exclude function would also be helpful. These are apparently provided by an additional module available for \$159.

Macros are strings of keyboard input which can be saved to disk as permanent or temporary files, able to be recalled and used as commands or inserted into the text with as little as a single keystroke. The input can be repetitive text, ranging from a word to several pages, or it can be a sequence of commands — a search, a merge, a maths operation, or even another macro or a repetition of itself.

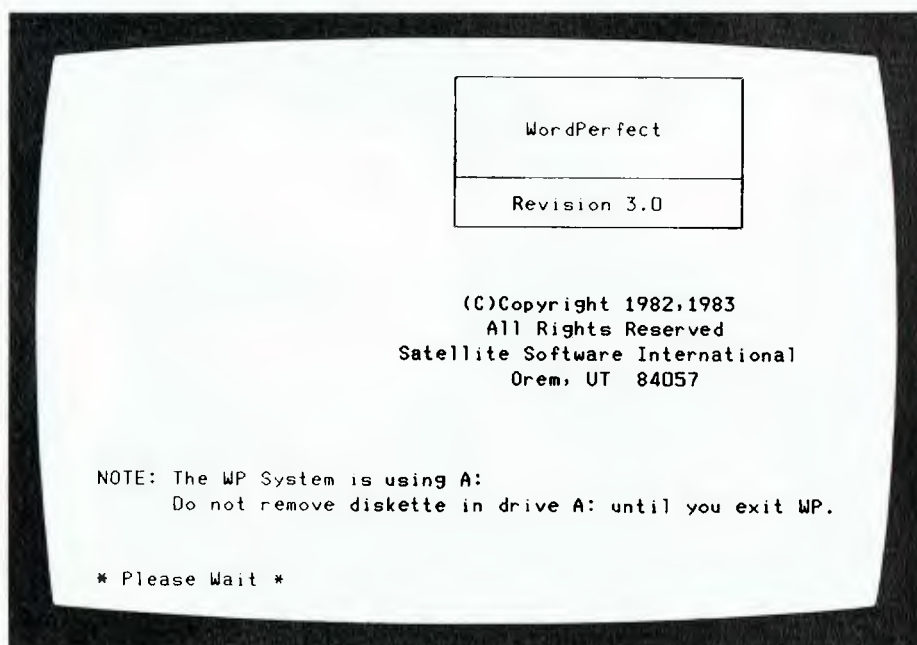
WordPerfect offers a variety of functions for constructing and executing merge operations. It is easy to use the merge functions as data entry tools for constructing data files that go to the disk, such as address lists or accounts records. It is equally useful for formatting output reports, custom form letters and address labels which may be either stored or printed. In conjunction with the maths and macro functions it is also possible to produce merged outputs which include calculated results.

Considered by themselves, WordPerfect's search/replace functions are unexceptional. Search

may be forward or reverse, for strings of characters or a formatting command, while search/replace works only in the forward direction and does not allow replacement of formatting commands. A wildcard function accepts any printing character at the point where it is placed in the search string. Lowercase letters in a search string are case independent (i.e., they also match uppercase), while uppercase matches only uppercase. However, there is no way to exclude specified characters in search strings as can be done with WordStar.

WordPerfect offers an excellent facility for formatting footnotes. It is limited only to the degree that it cannot cope with any footnote longer than a single page. However, within this limit, it seems fully able to keep the footnote and the text reference together on the same page. If the note cannot be completed on the original page, both the line referred to (plus subsequent text) and the footnote are pushed over onto the next page.

In its other features, WordPerfect almost always compares favorably with the best features of other word processing systems. The only features I have seen elsewhere that I miss in



WordPerfect sign-on menu.

WORD PERFECT

WordPerfect are automatic section numbering and indexing and a "case" construction (a single input code can be used once in a document to change all masculine genders to feminine genders).

I would also have to say that WordStar, because of its superior keystroking ergonomics and cursor movement, is still my preferred system for text entry.

However, once WordPerfect's formatting and print control features are considered, it is clearly the best system for any word processing involving a printout.

Based on my knowledge of available word processing systems for general purpose computers, WordPerfect would now be my first choice for virtually any word processing application I have any experience with.

Installation

Installing WordPerfect on the PC with DOS 2.x is relatively unproblematic on a dual disk system, given that Help.fil must be deleted to provide room for temporary files created during the configuration process. Config.sys must be placed on the disk and contain the configuration command FILES=16. The PC must be booted from this configured disk before WordPerfect will work properly — otherwise an error message displays. Also, WordPerfect requires enough space on the default (program) disk to hold a working copy of any text being edited. In this regard it is much like WordStar. Once configuration is complete the printer installation file may be deleted from the disk to provide this space.

WordPerfect supports a wide variety of printers. Two printer definitions may be used simultaneously, while a third sends output to the disk. Entering WP/S from the operating system gives access to a menu allowing the two printer definitions and their output ports to be specified. The separate program, Printer.exe, allows definitions to be constructed for virtually any printer and type font. Printer.exe is menu-driven and can easily be used by anyone who understands the operation

of the printer(s) to be installed. Up to 8 type fonts may be defined for each printer. WordPerfect supports a full 256-character font, and each character may be defined in terms of one or more ASCII correspondence codes (one input character may be defined to print out a string of

overstruck characters if needed), character width, and character centring within the width of the space provided for it. This allows any print element to be used that will physically fit the selected printer(s).

My only complaint about this system is that defining a proportional font is

Change Defaults

Enter one of the following keys to set defaults:

Function Key

Set Format - Tabs, E-Tabs, Margins, Spacing, H-Zone
Set - Alignment Char, Left Margin Release, N, Widow/Orphan, Hyphenate
Print Modes - Pitch, Font, Lines/Inch, Right Just, Underlining, SF Bin #
Print key - Printer #, Single Sheet Forms, Copies
Set Pg Fmt - Page # Pos, Page Length, Top Margin, Page # Col Pos

Selection:

Press Return to return to the Set-up Menu

Menu for changing text display default settings.

Printer # 1

1 Line Printer	2 Brother HR-15
3 Centronics 351	4 C. Itoh Prowriter
5 C. Itoh Starwriter	6 Diablo 620/630
7 Diablo 630 ECS	8 Digital LA-50
9 Digital LA-100	10 Digital LQP02
11 Epson FX/MX-Graftax/Type III	12 MPI Printmate 150
13 NEC 3550	14 NEC 3510/3530/7710/7730
15 NEC 3515/5515/7715/3525/7725	16 Okidata Microline 93
17 Olympia ESW 102/103/3000	18 Toshiba P1350
19 Qume Sprint 5/9/11/11+	

Selection: 1

Printer selection menu.

more than twice as tedious for WordPerfect as it is for any of the other word processing systems providing spacing or correspondence tables. Both character width and character centring must be defined independently to the nearest 120th of an inch.

However, many proportional fonts are already defined, and the simple solution for proportional printing is to instal one of the pre-defined type faces on the printer.

Invoking WP/S from the PC's operating system provides access to a series of menus allowing various system and formatting options to be selected.

Error handling and bugs

WordPerfect handles most error situations smoothly and appears to be almost completely crashproof. The only situation I have found that WordPerfect cannot cope with is to change the disk in the default drive while WordPerfect is invoked. Otherwise, WordPerfect seems well able to handle full disks, a disconnected printer, impossible commands and the like. It simply ignores impossible commands and/or displays a sensible error message and allows you to continue on with other functions that remain possible in the circumstances.

I have encountered a couple of minor problems which hopefully can be corrected in later revisions. When using the left/right temp margin function (indents a user-specified amount from both left and right margins) in proportional printing the last line of a paragraph does not wrap around until it reaches the permanent right margin. Again, I find it difficult to get the printer to restart on other than the first page of the file. Apparently a very exact sequence of commands must be given, and I am not yet able to consistently get this right.

Documentation

WordPerfect's documentation is extensive and aimed at the level of an experienced word processor operator.

It assumes an understanding of WP functions beyond the novice level. In the other direction, little information is provided to help the systems technician. The style of writing is clear and not excessively wordy. The manual is divided into reasonably logical sections and within most sections the commands are covered in an alphabetical sequence. In general, the description of each command includes one or more tutorial examples.

Instructions for using the commands are completely adequate, but I did find some frustrating inconsistencies.

One is that all the instructions refer to commands by the name of the function generated by a key, rather than to the key itself. This is unavoidable, given that WordPerfect is designed to be used on a variety of keyboards. The keyboard template and stickers provided for the PC help by giving the WordPerfect names for all of the keys. The manual also provides a map of the keyboard.

A second difficulty is that the manual uses different names for some keys than given on the map and labels provided. The worst example I encountered is that instructions for the MOVE function refer to a "RANGE" key. The instructions were comparatively meaningless until the operation of the "range" function could actually be seen in practice. However, despite these difficulties, WordPerfect's documentation is still better than that provided with most other packages.

Ergonomics

Any discussion of keystroking efficiency and logic must take into consideration the keyboard provided with the IBM-PC.

Very few functions (not even cursor movement) can be used without totally removing at least one hand (and usually both) from the home keys. Thus, the PC keyboard cannot be used for touch-typing if this involves using any function keys. Also, the keyboard (or WordPerfect) is designed so that <Ctrl> or <Alt>-[Char] keystroking patterns are not recognised as

command codes. Unlike WordStar or many of the other word processing packages, there is no alternative way of keystroking commands from the home keys. On the other hand, the <Ctrl> or <Alt>-[Char] sequences can be used to display and/or print any of 256 possible characters that are not accessed through the standard 96 keyboard characters.

The second major difficulty with the PC keyboard is the small size non-standard and awkward placements of the frequently used <Ctrl>, <Shift>, <Caps Lock>, and <Return> keys.

With Stearns, the standard function keys are larger, closer to the home keys, and placed where they are located on most typewriters. There are two large <Ctrl> keys placed below the shift keys, an <Alt> key at the bottom of a column of other function keys just to the right of the main keypad, a relatively standard number pad, and 10 "soft" function keys above the number keys (all reached relatively easily from the home keys). The Stearns "soft" function keys provide single-keystroke access to 40 functions, 10 at a time. Four sets of 10 functions are rotated through the keys by one of Stearns' special keys. The bottom line of the screen displays the present name of the function associated with each of the 10 keys. The arrangement provided by WordPerfect for the Stearns soft keys is not optimum, but Stearns' utility program for defining these keys easily allows the commands to be grouped optimally for the particular word processing applications.

Despite IBM's terrible keyboard, WordPerfect makes excellent use of the available resources. Most functions are accessed using keys that are clearly labelled by the template provided. Transparent stickers provide labels for those keys not identified by the template. Six common formatting options, forward and reverse search, and two merge prefixes are accessed with single keystrokes. All other labelled functions require <Shift>, <Ctrl> or <Alt> keys to be held down simultaneously, requiring one or both hands to be removed from the home

WORD PERFECT

keys. Some function keys give access to a variety of additional functions through subsidiary menus. All told, the labelled keys give access to several hundred different options. However, because of the labelling and menus, no memorisation of keystroking is required.

Cursor movement is provided via shifting the number pad (the default setting for the PC), with left, right, up and down arranged in a logical diamond as indicated by IBM's alternate labelling of the keys. Pressing the home key and then the direction arrow moves the cursor to the respective edge of the screen display being edited. Word left and word right are provided by holding the <Ctrl> key and pressing the respective arrow (again a two hand operation where both hands must be removed from the home keys). The top or bottom of the file, respectively, are reached by pressing the home key twice, followed by the appropriate up or down arrow. A minor irritation is that there is no overlap between successive screen displays when scrolling screen-by-screen. A Goto function is also provided for moving the cursor to a particular page, to the next occurrence of the specified character, or to the top or bottom of the current page. WordPerfect lacks two cursor movements provided by WordStar that I find very useful: setting and moving to placemarks, and returning to the position before the last command was executed.

Deletion functions also use the various keys on or near the cursor pad to delete to the left, to the right, a word left or right depending on the cursor position, to the end of the line, and to the end of the text page.

The PC keyboard provides an <Ins> key to toggle between insert and overstrike modes of text entry.

Screen display

WordPerfect's screen display provides true "what you see is what you get" editing. Line lengths, underlining, bolding, and page breaks all display as they will print, even to

taking into account different pitches, font changes, and changes into and out of proportional printing. Only superscripting or subscripting are indicated by a displayed code rather than an actual screen display. Font changes are not indicated by any visible marker. For overstruck characters, only the last character typed will display on the screen. However, in this regard it should be noted that the PC character generator provides 256 characters, including all the common letters with diacritical marks, many Greek characters, and many other common symbols. WordPerfect's extended font definitions allow a selection of these characters both to be displayed to the screen as one complete character and to be printed as overstrike characters.

Formatting codes, header/footer text and footnotes are entered into the text string as it is typed, but they do not display in the text entry mode. However, all is shown in the Reveal Fcnctns mode, which allows forward or backward cursor movement — one character at a time — and forward or reverse deletion to delete unwanted codes. Most function codes are clearly understandable, but to ensure there are no difficulties, the appendix to the

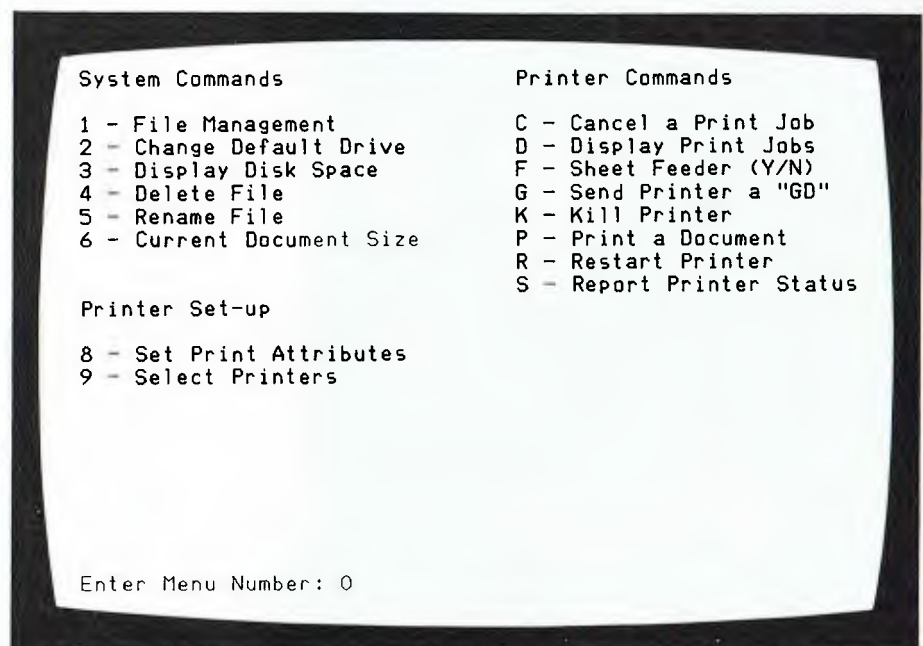
manual includes a complete list of the abbreviations.

My only complaint about the screen display is that it updates only the current line to show the effects of editing. On PC and Columbia even this updating is annoyingly slow. For someone like myself, who alters text in the middle of a paragraph as often as I type new text at the end, this can be a bit confusing: the old text remains on the lines below the correction. However, this is quite a reasonable compromise to speed processing time given that printer definitions and proportional spacing tables must be taken into account to generate the screen display. I would far rather have accurate line lengths than a total screen rewrite. By comparison to IBM's slow updating, Stearns' is virtually instantaneous.

Editing and formatting

WordPerfect provides all of the normal word processing functions, plus many features not found together on many other systems for general purpose computers.

For text entry these features are tabs; character enhancements



Menu used to change WordPerfect default system settings.

including type fonts of 256 displayable/printable characters, bolding, 4 styles of underlining, up to 8 different type fonts on one printer, with automatic halts on daisywheel printers to allow the printing element to be changed, superscripts and subscripts, ½ space "line advance" up or down, overstrike; hard, soft and conditional page breaks, "widow/orphan" searches; 4 kinds of dashes (non-hyphen, required, soft, and WP-suggested hyphens); automatic centring of individual lines; flush right typing, for dates etc and required space (i.e., newline not allowed at this space).

Other useful commands provided for document editing include forward and reverse searches, search and replace, search and replace with confirmation, and a repetition counter (〈Esc〉 [n] — where "n" is the number of repetitions desired for the immediately following command; default=8).

Although WordPerfect does not provide for split-screen editing, it does allow opening two files simultaneously and easy switching and transfer of blocks of text between them, as described in the manual's section on dual document editing.

WordPerfect's block commands are powerful, but the instructions in the manual are easily misunderstood and do not correspond either to the screen display or the keyboard: a block of text is defined by moving the cursor to the beginning or end of the desired region, pressing the 〈Block On/Off〉 key (called "Range" in the manual), moving the cursor to the other end, and then executing the desired block function.

WordPerfect defines the left and right margins of a column as being an align or tab character followed by all the characters up to the next tab, align or newline code. Cutting removes the defined block from the text and saves it in a temporary disk file while copying simply copies the block to the temporary file. The saved block may then be inserted elsewhere in the text by moving the cursor to that point, pressing the 〈Move〉 key again and selecting option 3 (Retrieve Column) or 4 (Retrieve Text), at which time the

block is reinserted into the text.

Sentences (any string of characters beginning with a space following a sentence ending and ending with . : ? or !); paragraphs (text beginning and ending with the hard new line character); or Page (text beginning and ending with a new page code) may be identified and moved without using the block function by selecting the appropriate option after selecting Cut or Copy option from the 〈Move〉 key.

Blocks of text may be permanently

It has the widest range of text formatting options of any of the packages I have reviewed. They are also easy to use.

saved, or be appended to the end of existing files. Other block operations include bolding, deleting, printing, underlining or changing the case (upper or lower) of the block.

WordPerfect's block operations are slightly more cumbersome to use than WordStar's, or those of the other word processing packages I have reviewed, but there is no doubt that they are also considerably more flexible than those offered by any of the other packages.

WordPerfect has the widest range of text formatting options of any of the word processing packages I have reviewed. In general they are also easy to use. They include page centring (top to bottom); line centring; centring a line on a column position; horizontal scrolling (up to 250 columns); several tab functions to column 158 (E-tabs are available for columns up to 250); setting the size of the "hot/zone" for assisted

hyphenation; amount of space for left margin release or left/right indentation; indent margins; lines per inch; characters per inch (pitch); justification on/off; new page number; page length; top margin; suppress page functions (suppresses automatic headers/footers and page numbers).

WordPerfect also has a powerful footnote function. When the document is printed, footnote numbers will appear as superscripts after the reference, while the text of the note is printed in a standard footnoting form at the bottom of the page. Footnotes are automatically renumbered through the text as they are inserted or deleted. Although the text of a footnote does not display on the screen while editing normal text, it is typed into the text string at that point, and can be displayed either by using the Reveal Fnctns mode or by using the "Footnote" edit option.

Headers and footers of several lines each may be entered or altered anywhere in the text. Two different headers and footers per page (e.g., flush right and flush left) are also allowed. Automatic page numbering functions may be placed anywhere in a footer or header.

Files and printing

Most of WordPerfect's printing and file management functions are accessed through the "Sys Cmnds" menu. Once the system is installed and defaults have been set, these functions are very simple to use.

Menu choice 1 is File Management. Pressing #1 displays a directory command on the status line, using the standard DOS wildcards to display the full directory. The DIR command may be edited to select only a portion of the full directory for display. Pressing 〈Return〉 displays an alphabetically indexed directory in a horizontal format giving file sizes and other particulars, plus the free space remaining on the designated disk. The first filename is highlighted in inverse video, and the status line offers four choices which can be selected by

WORD PERFECT

typing the appropriate number for Retrieve File, Delete File, Rename File or Print File. The highlighted block may be moved to any filename using the arrow keys before the number key is pressed.

Other functions in the "Sys Cmnds" menu which can be selected by pressing a single number or letter key include: change default drive; display disk space; delete file; rename file; current document size; set printer attributes (e.g., single sheet feed, etc.); select printer (1, 2, or print to disk), cancel a print job; display print jobs on queue; use sheet feeder; send "go" to printer; kill printer; print a document; restart printer and report printer status.

Some of these System Command functions again have subsidiary menus, most of which are also quite self-

explanatory. WordPerfect gives access to all of the operating system's essential file management functions, (except copying files) and does this far more smoothly than any of the other word processing packages I have used. With an automatically loading program, the WP operator truly does not need to know anything about the computer's operating system (beyond formatting new disks, if no one else is available to do this).

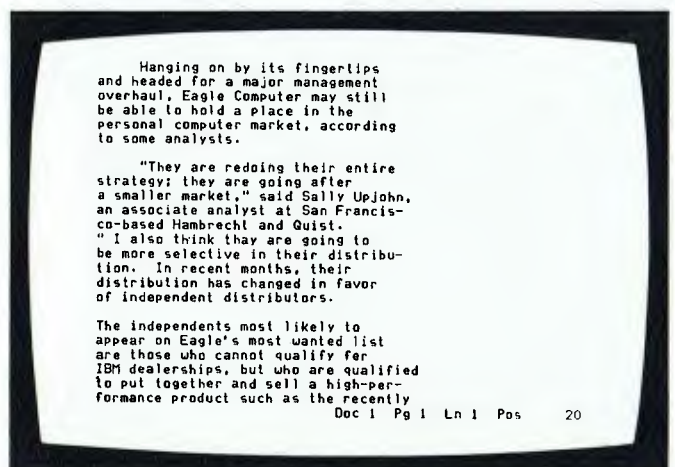
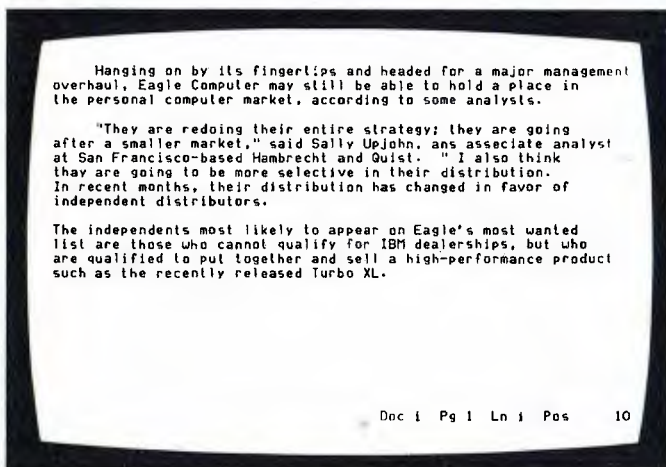
WordPerfect takes advantage of all of DOS 2.0's printer support features and is able to queue a number of print jobs for background printing while text is being edited. It can also print one screenful directly from the screen, or the complete file directly from the screen. These direct print functions work in a background mode with one or two keystrokes. However, to print a

complete file from the screen, enough space must be available on the default disk to hold a working copy of the complete file. Working space is not required on the default disk if the printing is done from a specified disk file.

The program appears to have enough easily accessible controls to handle any function a printer is able to perform. In this regard WordPerfect is by far the most capable word processing package I have yet reviewed.

Macros

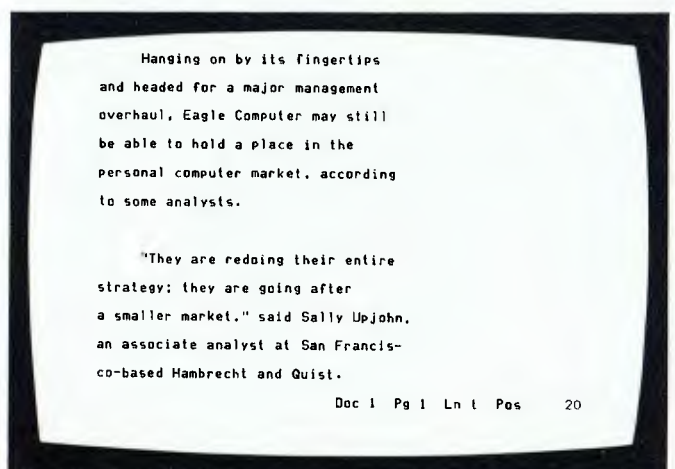
One of WordPerfect's most powerful features is its ability to remember and file as a stored program any combination of character and function keystrokes. Macros can be used for



Above: Text display using default settings.

Above right: Same text, with margin settings changed.

Right: Same text, but with double line spacing.



everything from the simple recall of repetitive words and phrases and boiler plate paragraphs to controlling complex conditional search and replace or merge printing operations.

In contrast to Spellbinder's M-Speak, WordPerfect uses no special programming language other than its normal but quite powerful functions, yet would seem to offer almost as much programming power to a skilled user as M-Speak. The main functions I find missing from WordPerfect are sorting functions or those for reporting line number, cursor position, and the like.

WordPerfect's macros can be named and stored as a permanently stored file; as an <Alt> [a-z] name; or as a single-letter temporary file name.

Merge operations

WordPerfect's merge operations allow much more than merge printing. Except for the absence of a case function (as found in Perfect Writer and The Final Word) WordPerfect's merge functions combine virtually all of the features found in any of the other merge printing facilities available for other word processing packages used.

The merge functions are made possible through a series of "merge commands" which may be typed into either primary or secondary files. The commands are labelled as such by <Ctrl> [Char] codes typed into the text of the file(s) concerned or inserted there by typing the appropriate function key.

Arithmetic functions

WordPerfect includes a powerful "math" package which enables addition, subtraction, multiplication and division on rows across columns of figures, and the calculation of subtotals, totals and grand totals down columns. All of the specific maths functions are accessed through menus. The maths functions are column oriented, and columns are simply defined by the specified tab stops used to format them.

Four kinds of columns are defined,

and up to 24 may be used in one calculation. The different types of columns are: text, numeric, calculation and totals column.

A text column allows the entry of descriptions, labels, etc, while in the maths mode — any numbers occurring in the designated text column are ignored.

WordPerfect's system defaults assume that columns 1-24 are numeric, with two digits to the right of the decimal, and with negative numbers designated by parentheses. The maths menu may be used to change the number of digits to the right of the decimal and to indicate negative numbers with the minus sign. The "Set" menu is used to change the decimal alignment symbol.

Numbers with decimal points (e.g., 6. or 5.335) are interpreted as constants to be used in the equations, while ordinal numbers (numbers without a decimal point) are interpreted as the value of the designated column in the equation. Operations are performed left to right except as altered by parentheses. (Only one level of parentheses is allowed.)

The result of the calculation is entered into the text file at the point of the calculation column, aligned on the tab stop.

The manual provides a variety of examples and exercises to demonstrate the maths functions.

The ability to use maths within macros and merge operations provides WordPerfect with very great power which should be particularly well suited to a variety of word processing needs in commercial, and especially accounting firms.

Other features

WordPerfect has several additional features that have not been covered in any of the previous sections.

The manual shows how to merge address files into formats for printing both continuous labels or 3-across labels; how to create lines and boxes around text and how to type complex equations into the text. WordPerfect offers more facilities for difficult

technical typing than any other program I have used and would quite readily meet the needs of typing complex mathematical texts and tables.

More complex features include the automatic creation of text columns, which can handle up to 5 columns per formatted page. Text formatted in columns may be moved as a block anywhere in the text and the columns will be automatically reformatted appropriate to their new place in the text.

Most functions work while in columns mode, to define the limits of the column rather than page. Advance Line, Margin Set, Tab Set, Footnotes, and Text Column Definition are not allowed while in the columns mode.

WordPerfect also offers an encryption procedure to scramble a document. Each protected file requires a password up to 75 characters long to be entered before it can be unscrambled to be read again.

Files can be stripped of all special control characters to create a pure ASCII file that can be read by DOS or other programs.

To sum up: WordPerfect is a completely appropriate word processing system for use by an accountancy firm. WordPerfect is comprehensively excellent — all other systems I have used or examined are excellent only for some applications. WordPerfect will be a credit to the image of any company using it as a customer interface, and a credit to any company including it as part of a computer package being supplied to customers.

PC

WordPerfect

Available from
Sourceware Pty Ltd
4/73 Albert Ave,
Chatswood NSW 2067.
Price: \$650.

William Hall is manager of W & R Hall, a company specialising in computer-based word processing bureau work and consultancy.



-The Developer's Solution

David Smith examines the C language and compares four of the best compilers

If you were going to create the next best-selling software package for the PC, what language would you write it in? Until recently, the safe bet would have been assembly language — nothing else offered its speed. But those software companies that wrote assembly language programs for computers using one kind of microprocessor (such as the popular Z80) paid a heavy price when it came time to convert their programs to the PC's 8088 microprocessor.

Assembly language programs are intimately tied to the hardware they work with. Using an assembly language program on a computer different from the one for which it was designed usually involves rewriting a large amount of code.

The cryptic nature of assembly language makes the process painstaking and slow. When a new machine or operating system hits the market, recording an assembly language program is a formidable task.

The solution for many software developers is C — a language that combines the efficiency of assembly language with the ease of use and the portability of a high-level language. Much of C's power and portability comes from its use of a standard library of common input/output (I/O) and string manipulation subroutines, a feature that frees the programmer from having to write machine-specific I/O routines.

While not strictly a part of the language, this library enables a programmer to take even a complex C program and transport it to another machine or operating system with minimal effort. The programmer is thus able to keep up with new hardware and operating system developments.

C is a block-structured, compiled language; programs are built in a modular fashion and then transformed

(compiled) into object code that can be executed by a computer's processor. C does not offer the instantaneous feedback of interpreted languages like Basic, but it does allow you to create modules of code and compile them individually. Thus, a complex program can be quickly constructed from smaller, simpler, tested sections of code.

More than 12 C compilers are available for the PC. Some support the

The compiler should mesh easily with the DOS Link utility, which pulls together the various sections of object code and necessary library routines.

entire C language, while others deal with only a subset of the language and don't include such features as floating-point maths operations or the use of bit-sized fields.

Some will not run under MS-DOS 2.00 or CP/M-86. The four compilers examined in this article — Computer Innovations' Optimising C86, Digital Research's Digital Research C, Microsoft/Lifeboat's Lattice C, and Mark Williams' MWC-86 — implement the full C language and are available in MS-DOS 2.00 and CP/M-86 versions.

Until recently, most C compilers for the PC were designed to work with a small-memory model, which limited source code to 64K-bytes and data to another 64K-bytes. Three of the four

packages reviewed here also support the large-memory model, which permits object code and data to occupy all available user memory.

The large-memory model is vital for anyone who writes large programs or programs that manipulate a great deal of data. Large-model programs are slow to compile, but that can't be avoided if the programming task at hand is complex.

Of course, compilation speed is not the only factor to consider when examining a compiler. A compiler's library should contain all standard I/O functions, named according to industry convention. This is crucial for portability, since you may want to compile a C program with different compilers and run it on different machines or under different operating systems. If a properly defined routine in one compiler's library is absent or mislabelled in another compiler's library, a C program built with the first may not link correctly under the second.

The compiler should also "optimise" its end product: it should examine object code and make it more efficient and compact if possible. This may involve, for example, eliminating redundant instructions or replacing three lines of code with two lines that perform the same task.

The compiler should mesh easily with the DOS Link utility, which pulls together the various sections of object code and necessary library subroutines, and the process should be clearly explained in the compiler's user manual. Error messages generated by the compiler (particularly those relating to syntax errors) should likewise be explicit. This makes it easier to locate a problem in the source code and fix it.

Optimising C86

Computer Innovations has been promising to update its reliable C86 compiler for nearly two years, and with Optimising C86 (version 2.00), it has finally done so. This compiler is reasonably fast (see Figure 1) and produces relatively compact object code. Unlike older versions of this compiler, Optimising C86 supports both small- and large-memory models and creates optimised object code that

is compatible with the DOS Link utility.

The library is close to the C standard as defined by Brian Kernighan and Dennis Ritchie in *The C Programming Language* (Prentice-Hall, Englewood Cliffs, New Jersey, 1976); I was able to take several C programs from a Dec minicomputer running Unix and compile, link, and run them on my PC with little effort.

The library includes a set of maths and trigonometric routines (often used for graphics and statistical programs) plus a number of routines for accessing new DOS 2.00 functions and special hardware features of the PC's 8088 microprocessor. Programs that manage the library and the disk storage of source code files are also part of the package.

Optimising C86 needs four passes to create executable object code. The

first, or preprocessor, pass handles macros and INCLUDE files; the second pass checks the source code for syntax errors; the third produces the object code; and the fourth (a new addition to this compiler) optimises the object code and produces object code compatible with Link or assembly language source code that can be used by the IBM Macro Assembler. Each compiler pass must be run separately, though you can simplify the process by using a batch file (see Listing 1). This allows you to verify that the header files are error-free.

Another option is a special run-time check that warns you if your program runs out of memory. Other new features are support for the 8087 numeric coprocessor and the ability to use variable names up to 31 characters long in a source code module (Link

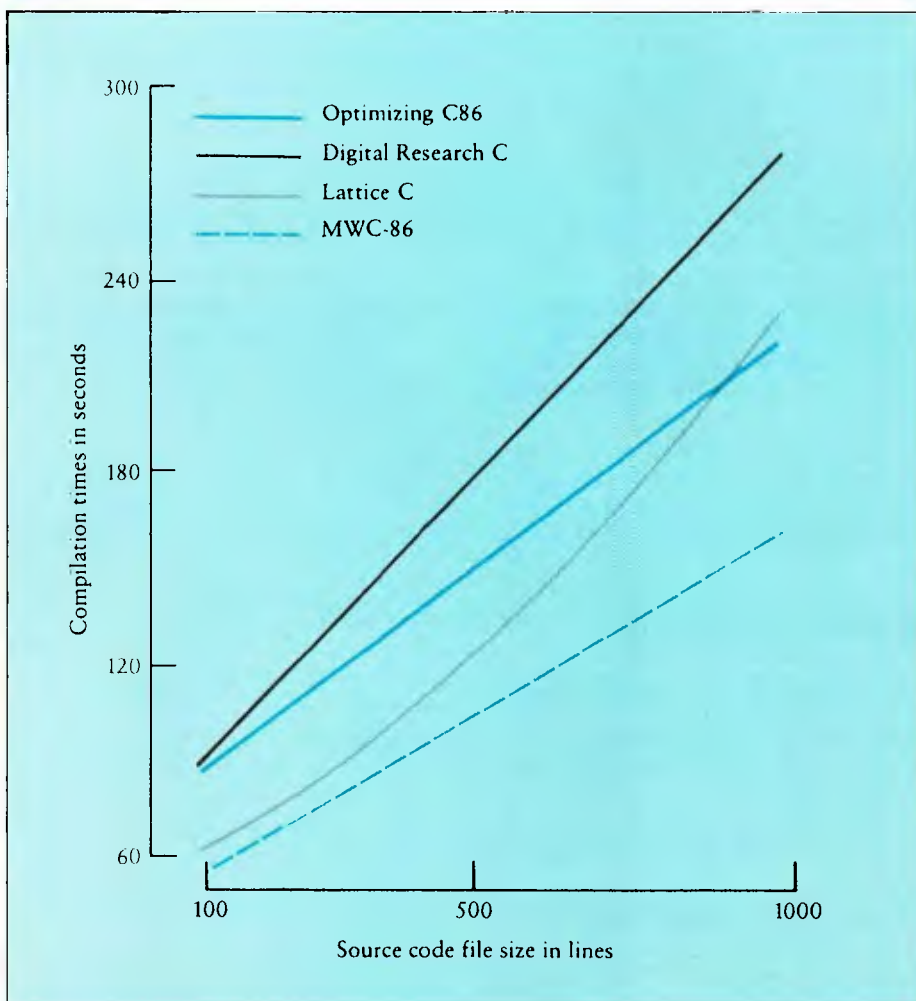


Figure 1: Compilation times.

limits you to eight characters between modules).

Some new debugging aids have been included in this version of the compiler. One option for the first pass lets you view the preprocessor's output after the header files have been inserted into the source code.

(A header file contains program definitions that are used in more than one module. Instead of embedding identical definitions into the code of several different modules, the compiler takes one set of definitions and inserts it before each module is compiled.)

While Optimising C86 produces object code that is nearly 20 per cent smaller than earlier versions and twice as fast, compiling speed is nearly 20 per cent slower. The entire package, which includes the compiler, header files, linker, and runtime libraries, has also ballooned from 200K-bytes to 345K-bytes. This is fine if you have a PC XT, but with only 360K-bytes of floppy disk storage possible, space is tight.

Optimising C86 comes in a binder with a 140-page user manual, two disks, and a copy of the Kernighan and Ritchie book. The manual gives simple instructions for compiling and executing a small program, along with notes on compiler options.

The section on library routines is thorough and includes a number of useful examples. Unfortunately, the same cannot be said for the discussion of Link, although its use with the compiler can be surmised with a little patience. Two annoying omissions are an index and an explanation of compiler error messages.

Digital Research C

Digital Research has been committed to the C language for quite some time. The company uses C for much of its language and applications development and is developing its next commercial operating system in C.

It is no surprise that Digital Research's C compiler ranks high in portability.

Unfortunately, Digital Research C does not do well in other areas. The compiler alone takes up 320K-bytes; it compiles slowly and produces large, sluggish object code. The company's

literature claims that Digital Research C is an optimising compiler, but I was unable to detect any hint of this when examining the resulting object code.

Digital Research C does offer a dazzling number of features. There are provisions for running the various

The literature claims that it is an optimising compiler, but I was unable to detect any hint of this when examining the resulting object code.

compiler passes from different disks (if your program is large and space is tight), for producing two different listings (source code with matching error messages, or source code and object code printed together), and for using four different memory models.

Digital Research C supports both

the large- and small-memory models, along with two other models — one for small code and large data and one for large code and small data. The compiler also supports the 8087 co-processor.

Digital Research C provides limited preprocessor control. For example, the command

```
drc test -dDEBUG
```

will compile a program named TEST.C and simulate the presence of the line

```
#define debug 1.
```

Note that the compiler changes DEBUG to debug, contrary to common practice. Uppercase and lowercase are significant in C.

This method contradicts the suggestion in the user manual's coding style appendix that constant names be all upper-case. The compiler also has difficulty finding header files when they are spread across two or more disks.

Of the four compilers, Digital Research C is the most attractively packaged. The boxed package includes five disks (the compiler, an assembler, a linker, a cross-reference utility, and a library manager), a user manual, and the Kernighan and Ritchie book. Documentation on the compiler and library is extensive and well indexed.

```
cc 1 %1

if not errorlevel 0 goto done

cc 2 %1

if not errorlevel 0 goto done

cc 3 %1

if not errorlevel 0 goto done

cc 4 %1

:done
```

Listing 1: DOS 2.00 batch file for automating compilation.

AN EPSON RX-100 PRINTER FOR THE PRICE OF A "CHEAPIE."

... OH... HOW... EMBARRASSING ...



If it weren't for the fact that the EPSON® RX-100 comes from the world's largest and most widely accepted range of quality printers, its price could fool you into thinking it was a "cheapie".

At a recommended retail price of only \$800* the EPSON RX-100 has to be the lowest-priced 136 column printer on the market.

But don't let the price fool you: the EPSON RX-100 is quite a printer.

Try one at your EPSON dealer.

EPSON AUSTRALIA: Unit 3, 17 Rodborough Road, Frenchs Forest, NSW 4525222. Suite 30, 101 Wickham Terrace, Brisbane, QLD 8325400. Level 3, 541 Blackburn Road, Waverley Square, Mount Waverley, VIC 5436455.**

EPSON AUSTRALIA
PTY LTD
The Secret of Success.

*List price not inclusive of sales tax. **Victorian office open from July 10. ® Registered trademark of Epson Corporation.

Lattice C

Lattice C was developed by Lattice Corp with funding from Lifeboat Associates and is available from both Lifeboat and Microsoft. (The Microsoft version is called the Microsoft C Compiler.) The latest version, (2.0a), supports four memory models, corrects several library problems, and adds routine to deal with DOS 2.00.

The compiler accepts the full C language with a few minor exceptions that are well documented in the user manual. Like Optimising C86, the Lattice compiler generates run-time memory checks and permits long (in this case, 39-character) variable names in a source code module.

The good news about Lattice C is that, of the four compilers I looked at, the object code it generates comes closest to superior assembly language written from scratch. Compilation time is quick. But the compiler tends to produce a stream of erroneous error messages after encountering its first true error in the source code. This domino effect is common in many compilers, and in this case it is acceptable, considering the compiler's speed. Its support of the large- and small-memory models is also notable.

The bad news concerns Lattice C's library. Several standard library routines are missing, and others are not labelled according to industry practice.

This may significantly affect program portability. The Setjmp and Longjmp routines, which are often used for error handling, and the Qsort algorithm, which allows sorting in memory, are all absent.

Experienced C programmers will also discover that identical strings in source code are "pooled" (combined into one) in the object code; this may make code difficult to debug when portability problems arise.

On the other hand, Lattice has provided new library routines for directly accessing the 8088 and DOS — some Peek and Poke memory — while others read the segment registers or cause software interrupts. In response to pressure from users, Lattice has also upgraded the library's low-level I/O routines so that certain operations (such as emptying I/O

buffers) are done automatically.

The single-memory model (either large or small) for Lattice C takes up 255K-bytes, which leaves enough room for a text editor on the same disk. Compiling requires two independent passes, but a batch file provided in the user manual makes the process simpler. The package also includes a library manager, but which one you get depends on the source of the package.

It consistently turned in the fastest compilation times and produced the most informative error messages.

Microsoft's version includes the company's own library manager (Lib) and a copy of Link, along with good documentation. Lifeboat provides Phoenix Software's PLIB86 but no link utility. Either package will provide a combined source code and object code listing, which is an adequate way of matching source code statements to their object code equivalents.

Lattice C's comprehensive user manual includes a clear explanation of compiler error messages, an excellent description of available library functions, and enough information about other conventions to allow a programmer to call assembly language routines from C. Both the Microsoft and Lifeboat packages come with a copy of the Kernighan and Ritchie text.

MWC-86

At the time of writing, the Mark Williams C compiler had not yet been released, although the company had enough confidence in its product to provide a pre-release version for

review. They have reason to be confident: MWC-86 compiles quickly and generates compact and quick-running object code.

MWC-86 consistently turned in the fastest compilation times (for programs exceeding 100 lines) and produced the most informative error messages, although the compiler tended to report nonexistent errors after encountering the first real error in a program. The compiler supports only the small-memory model, though this may not be the case in future releases.

MWC-86's major flaw is that its generated object code is incompatible with DOS's Link and must be linked using the Mark Williams proprietary link utility. This linker is slow and difficult to use directly. Fortunately, this process is hidden behind an "executive" program that runs the entire compilation process.

The compiler supports a number of interesting command line options, including several that control error messages. The Vsbook option will tell the compiler to issue an error message whenever the source code deviates from the Kernighan and Ritchie standard.

The library routines supplied with MWC-86 are extensive. As well as the standard library, several routines are provided that directly access the 8088 microprocessor to allow you to manipulate memory. For example, if a screen image is kept at an address in RAM that is normally inaccessible (and thus cannot be saved to disk), you can "move" this block of memory to a place in RAM where it can be copied using some of MWC-86's routines.

The package uses an assembler that is not compatible with the IBM Macro Assembler. But interfacing with assembly language in the the Mark Williams format is relatively easy, and the compiler can produce assembly language.

The compiler, linker, header files, and library occupy about 245K-bytes, which leaves enough room on disk for a text editor and several utility programs. The documentation that came with the pre-release package was marked "preliminary", but was

nevertheless fairly complete. The user manual needed an index, an explanation of error messages, and some reordering — concerns I hope Mark Williams will address in the released version of this compiler.

Comparing compilers

How fast a program compiles and the quality of its error messages are indications of how easy a compiler is to use. A few benchmark tests show how fast a program is likely to run; an examination of object code produced by each compiler indicates why. Looking at a compiler's library helps to determine how portable compiled programs will be.

In most tests, Lattice C compiles small programs (fewer than 100 lines) the fastest, while MWC-86 is the quickest with larger programs. Of the four compilers, only Lattice C detects syntax errors during its first pass. As a result, Lattice C reports errors very quickly, but sometimes it will let one real error trigger a chain of erroneous error messages throughout the rest of the code.

Digital Research C suffers from similar faults, although it will only report one error a line and will stop compiling after the 26th is encountered. Optimising C86 and MWC-86 recover easily after most simple errors; the latter package will even note when declared variables are not used — a useful aid in catching typing errors.

The ability to link object code efficiently depends on the quality of the compiler's linker and the size of the library that must be searched for routines that are not supplied in the program. Lattice C turned in the best link times; its library is fairly small and its linker is essentially the same as DOS's Link utility. Optimising C86 links object code more slowly because its library is larger.

Benchmark results

Computer benchmark tests are often an exercise in misleading with statistics. Unless a benchmark test is carefully chosen, the results may

have little relevance to actual operation.

The program traditionally used to measure a compiler's performance is the Sieve of Eratosthenes, an algorithm for calculating prime numbers. But this program makes few procedure calls and performs little in the way of I/O — unlike a typical C program.

The two benchmark tests I used, the Knight's Tour and the File Sort, are more representative measures of a C compiler's performance. The Knight's Tour makes many procedure calls and is thus a better measure of a compiler's ability to produce efficient object code. The File Sort is designed to measure the performance of the compiler's library and the compiler's ability to handle

I/O; accordingly, the test spends most of its time in library routines, as well as making many procedure calls and performing a great deal of I/O. The File Sort reads 35K-bytes of text into memory, sorts it, and then writes it out.

The benchmark tests were performed on a PC with 320K-bytes of RAM and two double-sided drives running DOS 2.00. Timings were obtained by changing the DOS prompt to display the time of day, running each test from a batch file, then noting the elapsed time when the time of day prompt reappeared.

Compilation and link times will be much faster if you use a hard-disk drive or disk emulator, but the benchmark results are representative of the performance differences you

	Computer Innovations Optimizing C86	Digital Research C	Lattice C	Mark Williams MWC-86
Knight's Tour				
Compilation time (minutes:seconds)	1:17	1:05	0:42	0:49
Link time (minutes:seconds)	1:11	0:56	0:32	0:47
Linked size (bytes)	12160	19456	11392	7561
Run time (minutes:seconds)	2:33	3:34	1:57	2:17
File Sort				
Compilation time (minutes:seconds)	1:23	1:04	0:42	0:51
Link time (minutes:seconds)	1:22	1:12	0:40	0:46
Linked size (bytes)	13568	33280	22528	9134
Run time (minutes:seconds)	0:57	2:08	1:07	0:45

Table 1: Benchmark test results.

can expect (see Table 1).

The test results reveal that Lattice C generally outperforms the other compilers on processor-intensive tasks but is surpassed by MWC-86 and Optimising C86 when library routines are used heavily or a significant amount of I/O is performed. Strictly speaking, Lattice C does not qualify for the File Sort test, as its library does not include a sort routine. But this test primarily measures a compiler's ability to read and write data. The Quicksort routine supplied with Optimising C86 was used with Lattice C to obtain a benchmark result.

Code quality

Most of these C compilers will not only choose the best sequence of instructions for a given statement but will also optimise the object code, making it smaller and faster. To measure object code quality, I fed two source code files through each compiler and examined a listing of the resulting object code.

The first source code file was designed to see what type of object code the compiler would generate for procedure calls, mathematical expressions, pointer indirection (those values that point to certain addresses in memory), and typical control structures (such as If, Then, and While statements). The second source code file contained statements crafted to provoke the optimising powers of the compiler.

Not surprisingly, the greatest differences among the four compilers showed up in object code generated for mathematical and logical expressions. Lattice C was the most efficient here because it keeps track of the contents of the PC's registers and does not have to produce code to reload the registers if the desired value is present.

Both Lattice C and MWC-86 were good at picking the most efficient code when incrementing a variable or changing the value of a pointer. When faced with the job of multiplying a number by two, all the compilers took the optimal course, although Optimising C86 and Digital Research

C often wasted time and memory evaluating complicated expressions.

Overall, Lattice C produced the smallest amount of object code in most tests. But once object code files were linked to produce executable files, the picture changed.

MWC-86 produced the smallest .EXE files, with Lattice C running a close second. Digital Research C

While none of these compilers is perfect, they are all solidly designed and produced correct object code in all tests I conducted.

produced files almost two to three times larger.

Why the big differences? The answer is found in the libraries.

The libraries

A standard library gives a C program the routines it needs to communicate with the operating system and perform other useful operations. The quality of a library can be judged by its completeness, its compatibility with the standard C library, the execution speed of its routines, and its ability to handle unusual situations.

Every compiler was inconsistent on at least one of these points. For example, some library routines that read data return special values to the C program to signify that the end of a file has been reached, and they will continue to return the end-of-file value if called repeatedly by the program.

But Lattice C ignored this convention and cheerfully marched on when asked to and eventually died in its tracks. A simple problem to work around, but an annoying one nevertheless.

A more pressing problem was discovered in Digital Research C when I tried to discover the size of a file. This information is particularly important to a program when it has a large data file and must make decisions about its disposition.

Normally a C program sets a marker at the end of a file and determines how many bytes it has travelled. While the other compilers responded with correct or almost correct answers, programs produced by Digital Research C simply stopped working.

The highest C

While none of these compilers is perfect, they are all solidly designed and produced correct object code in all tests I conducted. The factors that differentiate one compiler from another are speed, ease of use, and the quality of the generated object code. These features are summarised in Table 2.

I admit that I favor the earlier version of Computer Innovations' compiler, C86. It did not produce the fastest code, but it was easy to work with and left enough disk space for a text editor.

Optimising C86 was somewhat disappointing at first, because it is considerably larger than its predecessor and harder to install. But Optimising C86 does produce better code and supports the large-memory model. If you are using an earlier version of the compiler and find yourself hemmed in by the restrictions of a 64K-byte small-memory model, Optimising C86 may be the answer.

Digital Research has devoted a considerable amount of attention to Digital Research C, though this is not always evident. Digital Research C's support of multiple memory models and a number of extra options is salutary, but apparently little attention has been paid to the object code generator, certainly one of the most important functions of any compiler.

Two years ago, Digital Research C would have been an amazing compiler, but today it faces

ADD RAM

MULTI-TASKING/MULTI-USER ON IBM PC OR IBM PC XT AND IBM COMPATIBLE COMPUTERS

IBM is a trademark of IBM Corporation
(TM) indicates trademark of Profit Systems, Inc.
PC-DOS is a trademark of IBM Corporation



Profit Systems, Inc.

ADD RAM ELITE™ is a multi-function board which provides an **asynchronous** communication adapter, **real time clock/calendar**, **parallel printer adapter**, plus up to **512K memory** with parity "no piggyback."

ADD RAM PLUS™ is a multi function board which provides **two asynchronous** communication adapters, **real time clock/calendar**, plus up to **512K memory** with parity "no piggyback" — all on one board.

64K to 512K Memory, which supports full IBM Personal Computer parity operations, adds great versatility while saving system expansion slots. Board is socketed for easy memory expansion up to 512K by purchase of additional memory chips. All 512K space is on one board, "no piggyback". Fits perfectly into IBM PC XT too!

Designed to Meet User Requirements, this board, for example, would allow a modem and parallel printer to be hooked up simultaneously, while enjoying the convenience of the real time clock/calendar and up to 512K (½ Megabyte) memory with all the powerful **MULTI-TASKING** and **MULTI-USER** software support.

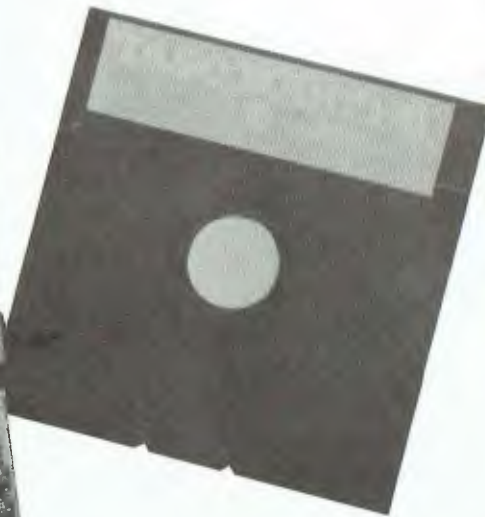
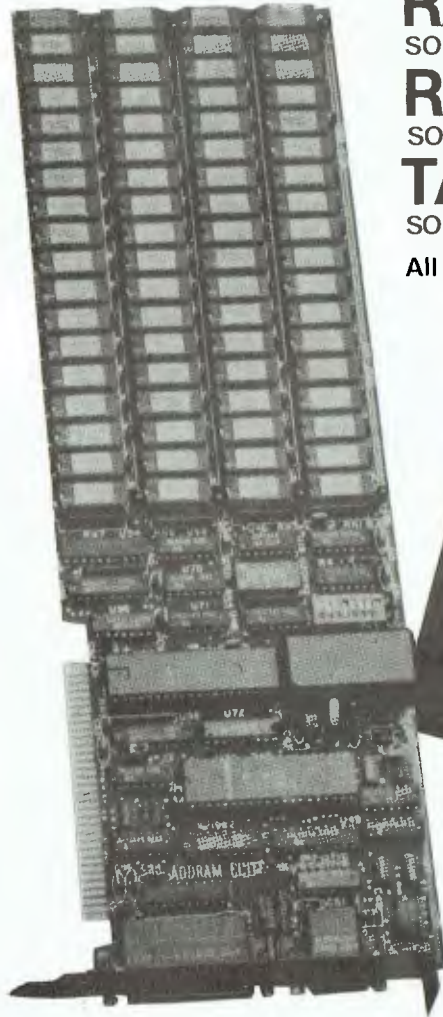
Installed Simply and Quickly by plugging directly into any one of the expansion slots provided on the IBM Personal Computer to which it is hardware and software compatible.

RAMDISK™
SOFTWARE!
RAMSPOOL™
SOFTWARE!
TASCMaster™
SOFTWARE!

All these are included and more...

Also available: **MULTIGRAPH**

- IBM Compatible Color/Monochrome Adapter Card
- Flicker Free Scrolling
- 32-bit Internal Architecture for Faster Operation
- Monochrome Graphics I-High Resolution 720 x 350 (Lotus 1-2-3 Compatible) 90 Column x 40 Lines
- Monochrome Graphics II-The Ability to Run Standard Software (Written for the IBM Color Card) on the Monochrome Monitor 80 Column x 40 lines.
- Expandable options: 132 columns, high resolution, parallel port.



For further information or
name of your local dealer call:

CLINICAL &
hospital
computers
86 Kareena Rd, Miranda
NSW Australia 2228
Phone: (02) 526 9101.

Dealer enquiries welcome.

INCLUDES

OPTIONAL

TASCMaster SOFTWARE

operating under PC-DOS allows up to 9 tasks (programs) to be run concurrently in background mode unattended. This integrated software package (combined with RAMDISK and RAMSPOOL) allows the user to move

freely from task to task just by simple key strokes without the necessity of terminating any one of them. Also each task can run its own Autoexecute file. TASCMaster greatly increases your productivity. Use TASCMaster and it's like having several Personal Computers at your fingertips.

MULTI-TASCMaster SOFTWARE which allows the addition of multi-user capability to the IBM PC by connecting additional terminals to serial ports.

RAMDISK SOFTWARE which offers up to 50 times faster speed in operation. Permits utilization of 1 or 2 RAMDISKS, each with up to 320K capacity integrated with TASCMaster Software to greatly enhance overall capability.

RAMSPOOL SOFTWARE which allows the use of the computer while printing information via printer buffer. This applies to either parallel or serial printers. And ... more than one spooler can work concurrently. Also integrated with TASCMaster Software.

SOFTWARE permitting the real time clock/calendar to automatically set date and time of day in the IBM PC.

X

X

X

X

X

	Computer Innovations Optimizing C86	Digital Research C	Lattice C	Mark Williams MWC-86
Version reviewed	2.00	1.03	2.0a	0.5 ¹
Full C library	Yes	Yes	Yes	Yes
Standard library	Good	Excellent	Fair	Good
Source supplied	Yes	No	No	No
Documentation	Fair	Good	Good	Fair ¹
Ease of use	Good	Fair	Fair	Good
Compilation time	Poor	Poor	Fair	Good
Error messages	Fair	Good	Fair	Good
Object code quality	Good	Fair	Excellent	Excellent
Object code size (linked)	Good	Poor	Good	Excellent
Object code speed	Good	Fair	Excellent	Excellent
Supports large model	Yes	Yes	Yes	No ²
Produces disassembled assembly listing	Yes	No	No	Yes
Link to assembly language	Yes	Yes	Yes	Yes
Compatible with DOS LINK utility	Yes	No	Yes	No
Supports 8087	Yes	Yes	No ²	No ²
Package includes				
Assembler	No	Yes	No	Yes
Linker	No	Yes	Yes	Yes
Library manager	Yes	Yes	Yes	Yes
Disk space required	344K	320K	255K	245K
Price	\$395	\$600	\$500	\$500

¹Pre-release version

²Promised for future release

Table 2: C compiler features.

formidable competition. Digital Research will have to make its compiler faster and leaner if it wants to stay in the running.

Lattice C produces excellent code and should convince even hardened programmers that there is a viable alternative to assembly language programming. For applications that require speed and do not rely heavily on library routines for I/O, Lattice C is a good choice. But if portability is a concern, keep in mind that this compiler's library does stray somewhat from the C standard.

Of all the compilers reviewed, MWC-86 would be my first choice for product development. It compiles quickly, produces superior error messages, and generates quick, compact object code.

The library is small and fast and closely follows the industry standard

for C libraries. The linker is slow and could use some work, but nothing is perfect in this world. However, as MWC-86 has yet to be officially released, the jury is still out.



Computer Innovations Optimising C86

Software Source
344 Oxford St
Bondi Junction NSW 2022.
Tel: (02) 389 6388.
Price: \$535.

Digital Research C

Arcom Pacific
252 Abbotsford Rd
Mayne, Qld 4006.
Tel: (07) 52 9522.
Price: \$540.

Lattice C

FMS
95 Canterbury Road
Middle Park, Vic 3206
Tel: (03) 699 9899.
Price: \$500.

Microsoft C

Microsoft
PO Box 98
Terrey Hills, NSW 2084.
Tel: (02) 450 2522.
Price: \$750.

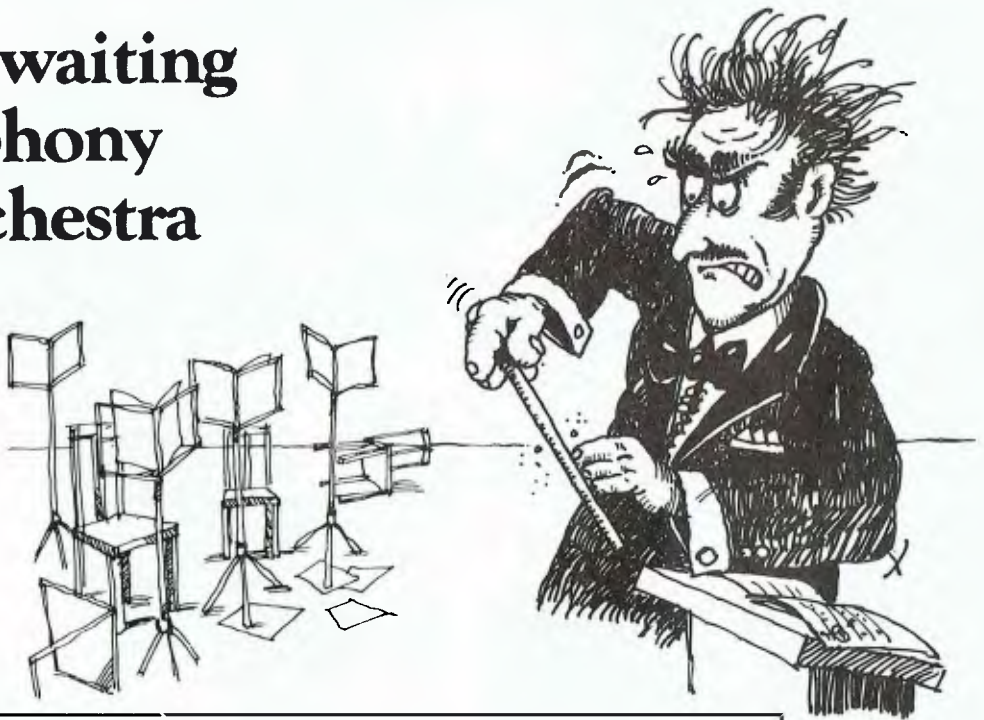
MWC-86

Digital Equipment Corp
Chatswood Plaza
Railway St
Chatswood, NSW 2067
Tel: (02) 412 5252
Price \$850

David Smith is a software engineer
for a California company.

**Are you still waiting
for the Symphony
when the orchestra
hasn't even
assembled?**

**Don't wait.
We have our
act together.**



Corporate **MIBA**™

The software solution for the decision makers



Spreadsheet modelling



Business graphs



Custom forms design



Mainframe data retrieval and electronic mail
including 3278 Communications with IRMA board



Database searching



Executive word processing

...all in one integrated, easy-to-use program.



Sydney: 4th Floor, 204 Clarence St., Sydney NSW 2000.

Phone: (02) 267 1711. Telex: MNC AA25026.

Melbourne: Suite 203, 620 St Kilda Rd., South

Melbourne Vic 3004. Phone: (03) 51 1406. Telex: AA39219.

Brisbane: (07) 343 9122. **Perth:** (09) 322 1677.

Intelligence provides full service, including: ★ system consultation ★ training ★ hotline service

A Tale of Two Handbooks

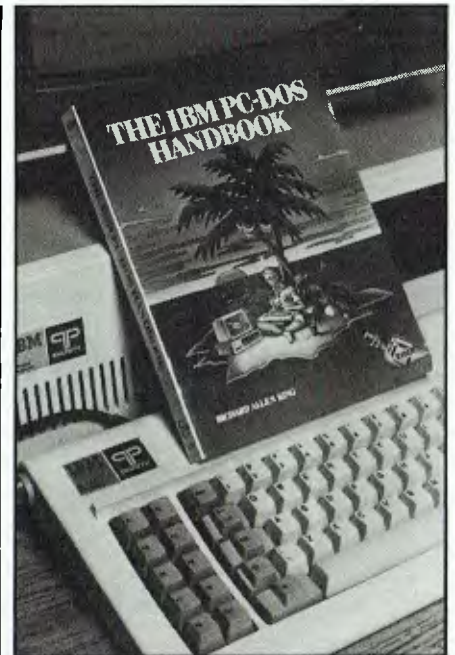
Those seeking help with the complexities of PC-DOS are advised to tread carefully, as Ian Robinson discovered.

How To Get Started With MS-DOS
Published by dilithium Press.
Price \$23.95.

The IBM PC-DOS Handbook
By Richard Allen King.
Published by Sybex Inc.
Price \$30.95.

Reviewed by Ian Robinson

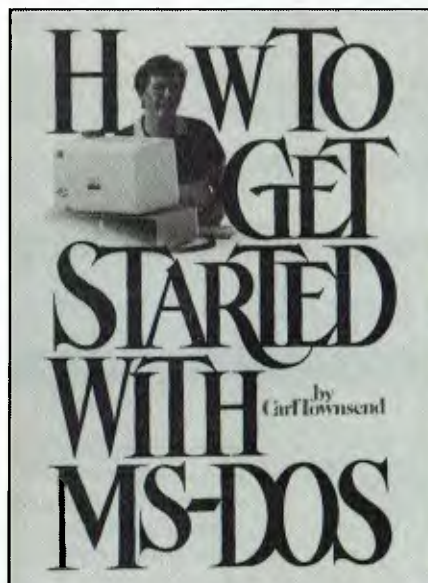
Habitual bookshop browsers will have noticed that, immediately following every major disaster, be it an airline crash, terrorist attack, or election defeat, there ensues a flood of cheap, ill prepared and hastily-written paperbacks that purport to tell it all in gruesome detail. It seems this spurious practice has now spread



to the PC book industry, a fact of which I was again reminded after reading the first of two books dealing with PC-DOS.

Carl Townsend's *How to Get Started With MS-DOS* appeared soon after the release of the PC in Australia. With a desperate hunger for any information pertaining to PC-DOS (the scars of a hacker background), I made the mistake of buying the first copy to appear in my local bookshop. Blinded by a lust for power over my PC, I missed all the obvious signs — long-winded title, short-winded text, glossy cover and bland diagrams. Ah-well . . . Caveat emptor.

The book is easy to read, mainly because the material covered is largely an insipid rehash of various IBM reference manuals. Most of the diagrams and tables used can be located (perhaps not as easily) in the



documentation supplied with the standard PC package.

The first three quarters of this slim book seems to be padded out with large headings, blank pages and redundant diagrams, while the final quarter consists of further checklists and tables, in appendix form. Although it might possibly be helpful to novice users as an all-round ready-reference, the book skirts over all crucial details of MS-DOS and, worst of all, describes only Version 1.00 (which never officially made it to Australia!).

The book's layout has been well planned, although the allocation of space leaves much to be desired. For instance, the potentially limitless subject of 8088 assembly language is glossed over in a single paragraph. (Strangely enough, this particular paragraph refers to something called "mneumonics" — perhaps a new type of plague.)

In complete contrast is Richard Allen King's *The IBM PC-DOS Handbook*. A masterpiece by comparison, this book is the "everything you ever wanted to know about Life, the Universe, and the IBM PC, but were too confused to ask..."

In a well-presented, reader-friendly style, *The IBM PC-DOS Handbook* describes in copious detail every feature and quirk of the PC's operating system. This is the book I should have bought in the first place, had it been available.

King's book is the most thorough expose of an operating system I have ever read, and the author leaves no byte unturned in his almost perverse quest to divulge the innermost secrets of PC-DOS. In fact, the book's front cover illustration is quite apt — a young hacker engrossed in an intimate relationship with his PC, all alone on

a romantic desert island, complete with palm tree and sunset.

But back to reality . . . The *Handbook* is well-organised, the style succinct and the title appropriate, as the book would be used mainly as a quick reference guide. The first and most detailed chapter covers the complex subject of disk files, tracks, sectors, clusters and directories. Subsequent chapters deal with the PC keyboard, monochrome and color graphics monitors, serial and parallel ports, date and time manipulation, batch mode programming and various DOS utilities.

The *IBM PC-DOS Handbook* has answered most of my questions and solved quite a few problems. It may not have been the first book to appear on the subject, but in the PC book publishing business (as in the PC business itself), the first is not necessarily the best. PC

READER FRIENDLY...



the complete magazine about IBM Personal Computers and IBM PC compatibles

YOU are using or plan to use an IBM PC or PC-compatible. Now you'll be able to get more out of your machine and keep pace with the fast-moving news and developments in this area by becoming a regular reader of *Australian PC World*. Without it each month, you'll fall behind, as the amount of available software, applications, innovations and state-of-the-art developments hitting the market is staggering!

Australian PC World is a sister magazine of *PC World* in the US, considered to be one of the most successful micro publications ever released. It therefore plugs

into an editorial resource which guarantees that subscribers to *Australian PC World* not only remain up-to-date with the Australian scene, but also with the IBM world in the US.

Don't miss out on even one issue of *Australian PC World*. By subscribing now, you can take advantage of our charter subscription offer at the charter rate of only \$25 (normal rate is \$30pa).

If you're not fully satisfied, you may cancel your subscription at any time and we'll cheerfully refund the unexpired portion of your subscription.

Unmasking an Integrator

Les Stein describes a straight-forward database manager and Charles Watson gives a user's view.

There are two things that Data Base Manager II — The Integrator is not. First, it is not dBase II. Second, it is not an "integrated" package which combines different functions such as word processing, spreadsheets and database management systems. It is an "integrator" in that it can be integrated with existing programs such as WordStar, VisiCalc and Lotus 1-2-3.

Database management systems (DBMS) have a taxonomy of their own. A functional division can be made in the programs that are available for microcomputers according to the amount of expertise needed to use them.

The most simple is the mailing list manager or accounting program that uses a DBMS where the internal operations such as sorting and the programming techniques used (hashing, B-trees) are not seen by the user.

The next level is the specialised DBMS where the user sets up the structure of the database by defining fields and records and enters and manipulates the data by either menus or straightforward commands.

At the top of microcomputer DBMS are programs where the functions of the database management system can be combined to form different procedures for specified applications by use of a programming language or macro commands that contain a set of procedures. In the latter class are dBase II, Knowledgeman, Dataflex.

Data Base Manager II falls squarely into the middle class, along with a large number of others such as Friday!, DataEase, LAN:Data-store, Omnifile, Power-base, TIM IV and others. It does not offer a

programming language and is a menu driven program that can only have one file of records open at a time.

Creating the database

On starting the program a list of databases you have created is presented, and one must be chosen or a new one created. The process of creation is straightforward. A name is given to the database and each field is given a name. A field name such as NAME and ADDRESS can be up to 10 characters long. The length of the field is then given and that is all that can be done.

Data Base Manager II cannot set up fields as only alphabetic or numeric to prevent accidental entry of data nor does it permit automatic formatting of decimal points or rounding off. It does not establish any masks or devices for data entry checking and verification, such as confirmation or range checking. Nor are there any special date fields or password protected fields. What this means is that the program can only be regarded as very simple and uncomplicated and should be used for databases where data accuracy is not a crucial requirement.

The program allows 40 different fields to be created, each having a maximum of 60 characters. These fields are set up vertically down the screen, and there is no method to design a screen for data entry, no highlighting, no color. A simple mailing list can only look as shown in Figure 1.

There are two noteworthy aspects about database creation: field names and their length can be changed, a new field added or an old one

Figure 1: Screen display of a record for entry.

```
File Name: MAIL      -- ENTRY MODE --      Record Entry: 39
1. LNAME      :Jones
2. FNAME      :Harry
3. SALUTATION:Harry
4. ORGANIS    :Computer Products Pty Ltd
5. ADDRESS    :333 Pitt Street
6. CITY       :Svdnev
7. STATE      :N.S.W.
8. COMMENTS   :Bad Paver
```

F1 re-start, F2 skip to end, F3 prev. entry, F4 back-up, F9 date

Figure 2: Calculation choices.

Data Base CALCULATION Menu

-
- | | |
|----------------------------------|--|
| 1.. Add two fields | 13.. Days between two fields |
| 2.. Subtract two fields | 14.. Days between a field and a constant |
| 3.. Multiply two fields | 15.. Days between a constant and a field |
| 4.. Divide two fields | 16.. Date: two fields |
| 5.. Add: constant + field | 17.. Date: date field and days constant |
| 6.. Subtract: field - constant | 18.. Date: days field and date constant |
| 7.. Subtract: constant - field | |
| 8.. Multiply: field * constant | |
| 9.. Divide: field / constant | |
| 10.. Divide: constant / field | |
| 11.. Sum fields | |
| 12.. Calculate average of fields | |
-

Enter a Selection # and Press RETURN : —

DATA BASE MANAGER II

deleted after at least one record has been entered; and limited field calculations can be performed. These can operate either on the sum or average of numbers in the fields or by making calculations between a maximum of two fields, or one field and a constant. Data calculations are also performed. (See Figure 2).

Sorting

Sorting is relatively fast on small files. In a recent comparison of Data Base Manager II with 19 other comparable programs, the Software Digest Ratings Newsletter gave it first place on a sort through 1000 records on one field. This is particularly important as the program does not use key fields nor does it use or create an index. Sorting is done without disk access for up to 2500 records and the results of any sort must be written out to a sorted database to be saved.

A "multi-level" disk sort allows a sort on two fields, such as LAST NAME, FIRST NAME. The "multi-level" is restricted to two fields and the database is reconfigured permanently to the sorted order.

As no index is used, the program must make its way through the entire file to retrieve a single record. Two basic forms of searching are provided. The first is called VIEW DATA on the Main Menu and allows you to review records only if you know the number given to them or want to flip through them one at a time. The second method of search is by matching strings or numbers on any or all fields using wild cards (see Figure 3).

What is called a "General Five-Level Search" allows the use of logical but not Boolean operators for each field. So, on the STATE field you could look for STATE = 'WESTERN AUSTRALIA' or, alternatively, STATE < WESTERN AUSTRALIA which would find all other States as the first

letters of their names are less than "W". It is not possible to search for STATE = 'WESTERN AUSTRALIA' OR STATE = 'TASMANIA' on the one search. The search is carried out one field at a time and a series of questions are asked for each search level such as which logical operator to use and whether the comparison is alphabetic or numeric.

A "soundex" or phonetic search capacity is offered which purports to find matches if they sound alike. A test revealed that the first letter must be the same, so the name Phyllis cannot be found by using Filice. It would have been useful to know the nature of the conditions in the algorithm in order to establish the rules of a phonetic search. The results were too inconsistent to have any confidence in this method of searching.

Reports

The result of any search or an examination of all or part of the database can be displayed in the form used for data entry or on customised reports. Data Base Manager II allows the creation of several report forms for each database. The fields to be included in the report are chosen and the spaces and presentation will automatically be done by the program. This form can be changed and customised by redefining the length of data to be presented (e.g. the FIRST NAME field to only display the first letter or initial) and the space between fields. With the addition of a title and a footnote this is a very flexible and easy system to use to create appropriate forms for the output of data. An optional field for calculations can be added as well.

Data interchange

The title "INTEGRATOR" derives from the ability of Data Base Manager II to send its output to or

take input from the following files: VisiCalc DIF, Lotus 1-2-3 import or worksheet, Multiplan SYLK, MailMerge, an ASCII file set out in a table and text files created by a word processor (see Figure 4). For instance, WordStar could be used to create a mailing list and the program will allow you to go through the text file and place each entry into a record. This is a complicated operation but an attempt to move 30 names into a name-and-address database went very smoothly and was a success. This aspect of the program is most impressive and distinguishes the program from competitors in this class which produce straight ASCII files only. It should be noted that a number of recent programs purport to read and write DIF (Data Interchange Format) standard files (Dataease, Advanced DB Master, Omnifile, 10-Base, TIM IV and, of course, VisiFile).

Who needs it?

Data Base Manager II is easy to learn and use, easy to combine with other popular applications and does nothing to complicate the entry or retrieval of data. On the other hand, it is slow in operation and of no use where the accuracy of data is paramount. It's adequate if you have a simple application in mind such as a mailing list, membership list, employee register, card catalogue of books, magazines and the like or, at a pinch, an accounts receivable or payable list.

PC

Data Base Manager II

SCA Software Corp of Australia
449 Swanston St
Melbourne 3000.
Tel: (03) 347 7011.

Les Stein is an associate professor in the School of Law at the University of Western Australia.

Figure 3:
Search menu.

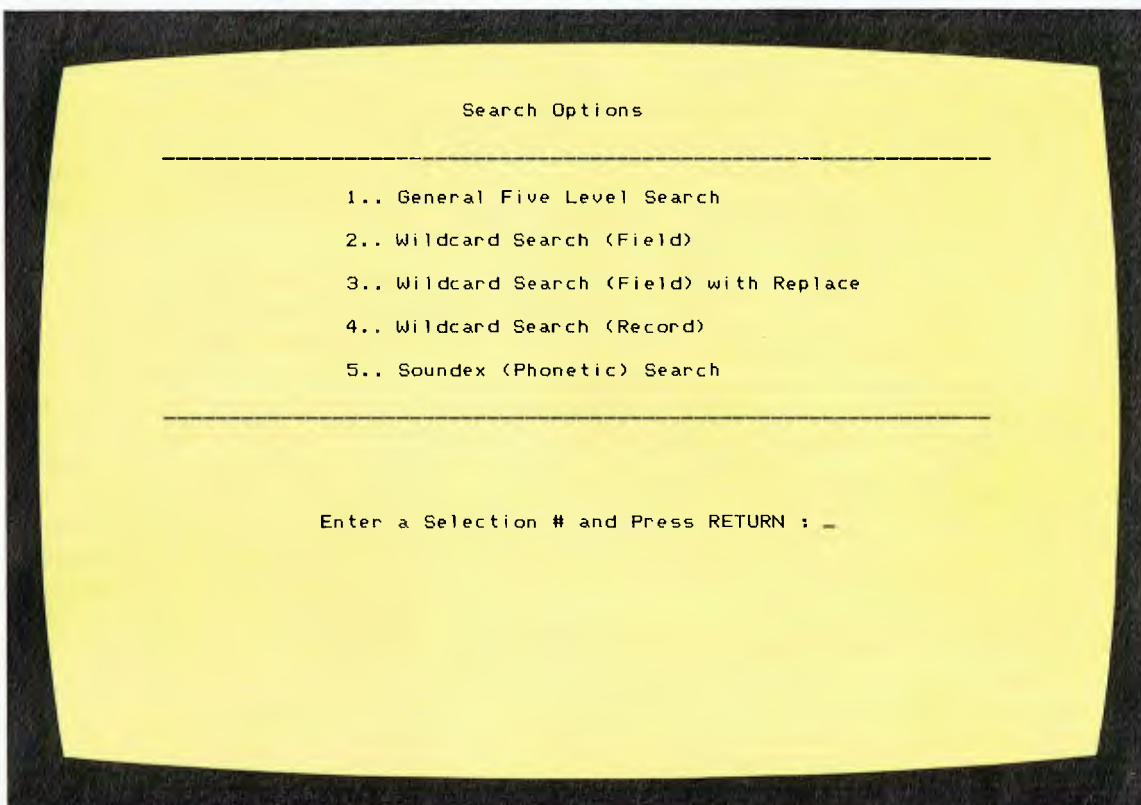
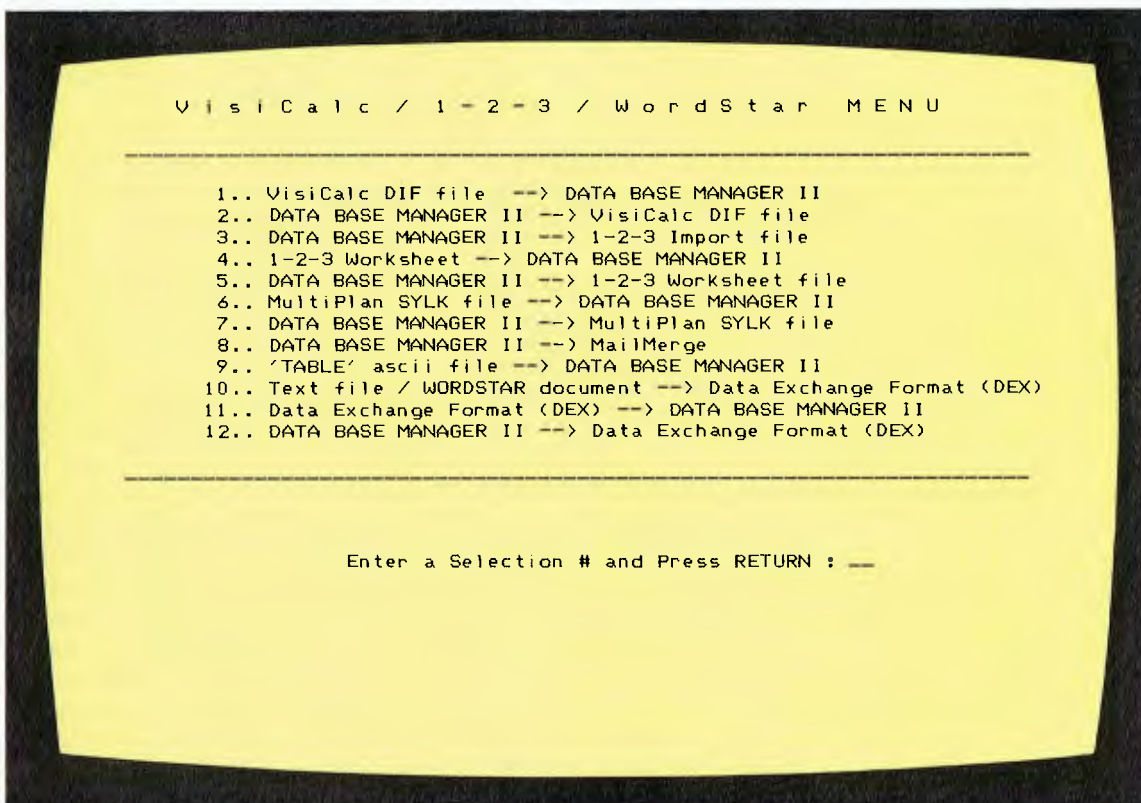


Figure 4: Menu for
the "Integrator"
function.



IMPATIENT USER'S FRIEND

by **CHARLES WATSON**

I was driven to buy DBM2 after making an unsuccessful attempt to come to terms with dBase II. I spent a day working through exercises and setting up sample files to play with; a day full of frustration with poor documentation and incomplete instructions. When I started work the next day, I was still prepared to believe that learning dBase II was possible. I booted up the demo disk again and went searching for the files I had painstakingly entered the day before. No files! If there was any indication that the demo disk would not save files, it was not obvious enough for me to notice. I had wasted a whole day creating a set of files to try out the command structure and was now faced with the job of starting again.

My supplier accepted the program back and offered me Data Base Manager II — The Integrator (DBM2), saying it was kinder to impatient people like me and could probably handle the applications I had in mind.

Getting started

Off I went with DBM2 and began setting up the record format for a series of large multi-level mailing lists. When you begin DBM2 you are led straight to a complete menu of its functions (18 in all, including return to DOS). Most of the choices are easy to understand. I was able to find my

way through most of the functions without references to the manual in the first attempt.

The procedures for setting up record fields and entering data are quite straightforward and prompts at the bottom of the screen leave no doubt about how to escape, move to the next record and so on. The prompt system is, in fact, intrusive at times because each and every question posed has to be answered before one can move to the next function. This inflexibility is the price one must pay for having a friendly program.

Sorting and searching

The sort and search functions are surprisingly extensive for a program of this style, and they are quite efficient as long as the files are not too large. About 250 records seemed to be the limit with my 256K-bytes machine. The Sort option offers a choice between a "fast in-memory sort" or a "multi-level disk sort". The "fast in-memory sort" will sort on an alphabetical, numeric, or date basis — in either ascending or descending order. The "multi-level disk sort" will accept up to five separate designations but is painfully slow.

The ponderously slow multi-level sort convinced me that the simple in-memory sort was about the limit of feasible operation for this function. Even with the in-memory sort there are problems with files over a certain size, such as mailing lists of 300 items or more. The trick is obviously to keep the size of files down to about 250 records if you think you are going to do a lot of sorting.

The search option provides not only wildcard options but also a five level search using logical operators (=, <, >, etc) linked by AND or OR conditions to search

on different fields at the same time. Like the Sort function, Search can be excruciatingly slow with large files, even if you have a hard disk.

Using the data

The Change Data and Delete Data functions only find a particular record on the basis of the number. It seems a pity not to have the option of some other search function for changing and deleting.

The Report Format options are fairly easy to follow, even without the manual. There are, however, a few frustrations in setting up new formats, as I will explain.

My first struggle with formats was the mailing lists and was caused by DBM2's inability to suppress trailing blanks in fields that were only partly filled or entirely blank. This shortcoming on something that is vital for a satisfactory mailing label list was not explained in the manual. Some details were released soon after in a newsletter from the distributor (SCA). Some other residual problems were resolved by using the telephone help service that SCA offers. The expertise and patience of the engineers went a long way to compensate for the deficient documentation that accompanied the original product.

I still have one last annoying report formatting problem: form length changes in the Form Letter option. As there is no form length option described in my manual, I contacted the SCA engineers and found that form lengths can be set with a line of Basic code. Sounds good, but I have not been able to get it to work yet! Most of these format troubles would be solved by having an up-to-date and accurate manual. If one exists, I have not been able to get my hands on it — despite a number of phone

requests to the distributor.

With the DBM2 form letter function, a great deal of potential pain is avoided, and the large files you may have assembled on DBM2 can be pressed into service producing letters to fill the in-trays of your customers or associates. The form letter function is not, however, as problem-free as you might be hoping. I managed to produce form letters quickly but the little details (position of left margin, adjustment for different form lengths) proved very difficult to control — more phone calls to SCA and more cursing of the incomplete manual.

Function keys

I also found what appears to be a real error in the form letter function. After the directory is called to select a text file, the screen message says that one can abort by pressing F1. It doesn't work: escape is only possible by hitting the Enter key.

The whole subject of escape or abort routines is perhaps the one that annoys me most about DBM2. Depending on which functions you are using, escape must be effected with the Enter key, the Escape key, the F10 key, the letter "E", the Ctrl-Break key combination, or the F1 key. In addition, under some circumstances escape to the main menu is executed with the "M" key. On some occasions the instruction for the escape routine appears on the screen, but often no clue is given, leaving the user to try all combinations until something happens. Worse, in some cases none of these worked at all — leaving the dreaded Ctrl-Alt-Del sequence as the only way out.

Perhaps you are not as obsessed about escape routes as I am but I feel that the growing anarchy

among abort/escape commands should be stopped before there is a different instruction for every function in different parts of a program!

DBM2, like many other current programs, does not make use of "hot" keys in menu selections: each selection has to be followed by striking the Enter key instead of instantaneously activating the option chosen. This may seem like a minor point but there are lots of menus in DBM2 — almost every function has one and some have a few. I suppose that there is some good reason that "hot" keys were not employed for all of these menus (like the necessity sometimes to confirm a crucial choice) but it makes the program seem a bit chunky.

Integrating form letters

In addition to the ability to merge and work with other file formats, the other reason for having these data interchange functions is to import ASCII test files from outside sources (in my case the MultiMate word processor) for the form letter function. This allows the use of mailing list files entered on DBM2 to be merged with letters or other documents generated on a word processor. Such a function is particularly vital if you work with MultiMate because its own inbuilt mailmerge function is diabolical.

Manual

I mentioned that one could do a great deal with DBM2 without using the manual because the program is generally well signposted. However, there certainly are times when you will need to use the manual and you will probably end up wishing like I did that there was a little more of

it! What is there is quite good — clearly written and attractively set out. Apart from outright omissions (mentioned above in the discussion of form letters), the manual lacks sufficient examples and sometimes has unnecessarily brief, even cryptic, explanations of particular features. What this means is that it is probably better than most manuals you will use, but that it could do with a generous revision. Any revision of the manual would do well to include a decent introduction and overview before launching into a series of specific chapters on individual functions.

A rather unusual feature of the package is the inclusion of a cassette tape.

Frankly, I doubt if many users will find the tape of very much use at all — a pity because an introductory tutorial could work well, particularly if it complemented the manual rather than repeated much of the written material.

Why I keep using it

Escape codes apart, DBM2 represents a very good middle-of-the-road database program. The fact that most functions are well prompted on the screen makes it easy to introduce into an office environment without the need for support from a programmer or special training course. Like many packages pitched at this market, it has some very significant intrinsic disadvantages (slow sorting and searching with very big files) but for most common office operations it is fast and efficient and has the major advantage that it can be pressed into service immediately. It is good for those situations where you have just bought a computer system to deal with an urgent job and have not got three months to spare while a new program is "broken in".

PC



RUNS IBM™ PC SOFTWARE

Lotus 1-2-3™, dBASE II™, Multimate™, Word™, Flight Simulator™, Concurrent CP/M-86™ — You name it and the TeleVideo will run it. For the professional who's going places the Televideo TPC II is the one!

You can use it at the office, at home or on the move to make you more productive. Of course you get all the features like 256K RAM memory, printer and communications ports and graphics as standard. What else would you expect but the best value around to keep you ahead of the corporate pack.

Pick up the portable that gives the power and performance you expect now and gives the growth to networks and communications when you need it.

For more information contact

DATA PERIPHERALS PTY LTD (NORTH RYDE),
(02) 888 5733; Victoria (Melbourne) (03) 598 5111;
Queensland (Brisbane) (07) 44 8943.
DATA PERIPHERALS PTY LTD, NEW ZEALAND
(AUCKLAND), (9) 49 1303.



GET IN ON
THE BOOM™

TeleVideo Personal Computers

TeleVideo Systems, Inc.

IBM is a registered trademark of International Business Machines. Lotus 1-2-3 is a trademark of Lotus Development Corporation. dBase II is a trademark of Ashton-Tate. Word and Flight Simulator are trademarks of Microsoft Corporation. Concurrent CP/M-86 is a trademark of Digital Research.

The Computerised Analyst

The use of PCs for psychological testing is being pioneered in Australia. Ian Robinson investigates.

Now that IBM has established the personal computer's credibility as a viable and effective business tool, potential applications package developers are no longer hindered by the subconscious fear of not being taken seriously. Hence we are finding a growing proportion of the business community taking a closer look at the PC, in an effort to discover how it could be applied to other tasks outside of the mainstream business applications such as word processing or database management.

Typical of those professions just beginning to realise the massive potential of personal computers is industrial psychology. The various surveys and questionnaires used in this field are a classic case of a system just crying out to be computerised, as anyone who has had to interpret survey results would understand. Most of the

popular tests and analyses are fairly structured to begin with, (to aid comparisons and classification), so conversion to a computerised format is really the next logical step in the refinement process.

Behavior analysis

One of the most popular and widely used of these tests, the Personal Profile Analysis (PPA), has recently been adapted for use on the PC by Australian company TIMS Software International Inc. The PPA has been used since 1928 to help in the evaluation of personal behavior in the workplace and other environments. It has widespread use around the world in personnel recruitment and in counselling long-term staff.

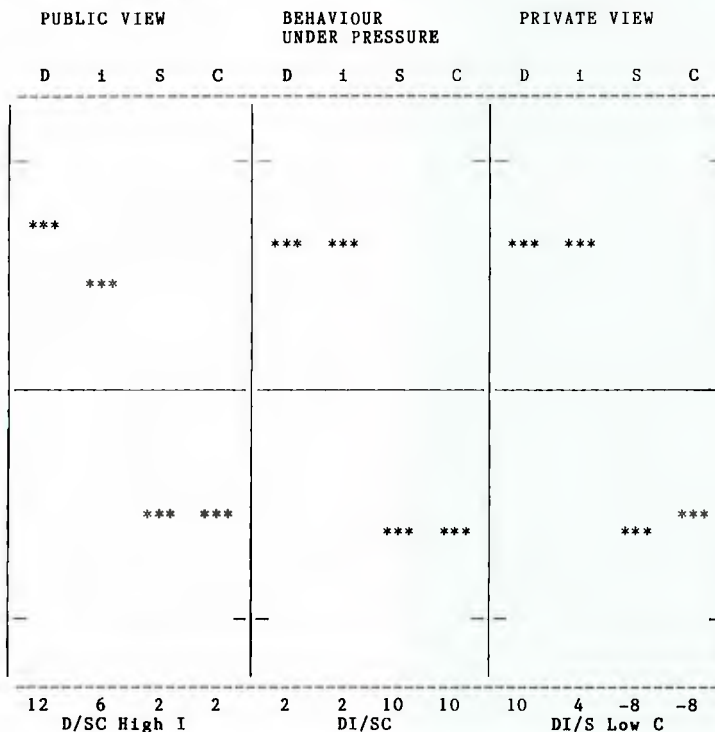
The PPA is based on the idea that many of the personal stresses and the problems experienced in interpersonal relationships and work situations are caused by our trying to act and interact with too little information — both about ourselves and others. The organisation of people into cohesive and efficient work groups is an especially complex problem, and without an understanding of the attitudes, strengths and weaknesses involved there can arise uncomfortable, unproductive work environments. The PPA was developed as a tool to help provide the information necessary for creating comfortable, rewarding relationships and work environments.

The PPA is designed to measure the strengths and directions of the four basic drives which are supposedly critical for work



Jeff Whittle shows the PPA package.

PPA analysis on 07-JUN-1984 for BOB JOLLY



(C)Copyright TIMS Software International 1984

PPA raport on 07-JUN-1984 for BOB JOLLY

DETAILED STATEMENT

General

Your profiles indicate that you are an integrative leader who works with and through people. You have an outgoing interest in people and an ability to gain the respect and gain from a variety of types of individuals. You will strive to do business in a friendly way while pushing forward to win your objectives and sell your point of view. You are usually a good co-ordinator who is willing to delegate. You are poised and show confidence and a positive attitude in most situations.

Areas of Concern

At times you may be inattentive to the little things. You will need to be careful that you do not over-estimate your ability to motivate people or change their behaviour. Because of your general willingness to accept others you may be too optimistic regarding the potential of people and you may need to lower your expectations and make more realistic evaluations of others. You may be seen to push too hard on others.

Application

You will want challenging assignments involving varied contact with people. You will want prestige, authority and the position that goes with it. You will seek freedom from routine and regimentation. You may often prefer an outside assignment involving travel. Public recognition and status symbols will be important to you. You are an individual who wants to develop a strong identification with your organisation and receive a strong identification with the work that he or she does. Your tips are also important to you. You do not recur in terms of real

Organisational Controls

For best results you will need a variety of activities and an opportunity to work with people. You should be supplied with analytical data. Your assignments should give you some mobility and you will work well with a democratic manager with whom you can associate. You need assignments that present a challenge to you and give you an opportunity to show results.

General Conclusion

Your profiles indicate that you are a trusting, enthusiastic individual who will aim at developing friendships. You will judge others by their positive acceptance of you, and you influence them by your friendliness and intelligence. You will want straight-forward communication. Your value to the organization is that you accomplish goals through people. You are a dependable, patient, good listener. You may at times tend to use a non-direct approach and you may even be overly tolerant, although when pressed you can become very restless and forthright. It seems very likely that you fear being taken advantage of and that you would be more effective with more realistic deadlines, when you have an opportunity to use your initiative and when there is a sense of urgency about your work.

STRESS REACTION

Under stress you are very results-oriented. You will achieve results through people and will act positively and directly in the face of opposition. You will be willing to stand up and fight for your position. You will also be willing to take a chance. But will need to be careful that you don't overuse your prerogative. During such times you would display self-confidence and you will win people through persuasiveness and emotional appeal. You will be a versatile self-starter who responds rapidly to competition. However, you may tend to come on very strongly and you should be careful not to try to control or manipulate others.

(C)Copyright TMS Software International 1984

A graph and profile generated by the PPA package.

performance, namely dominance, inducement, steadiness, and compliance. Although the PPA is not a clinical instrument (it does not require an administrator with psychological qualifications), it is claimed to offer valuable and relevant information to aid in decision-making and job allocation.

The history of PPA

The PPA was created in 1928 by Dr Moulton Marston, and was substantially revised by American consultant Dr Tom Hendrickson — a director of TIMS Software International — using a paper system card. This card-based system is claimed to have been used in thousands of cases around the world with resounding success. The most recent PPA development was achieved in Australia last year, when the complete PPA system was refined, simplified and computerised on an IBM PC.

Besides Dr Hendrickson, TIMS Software International has two Australian directors: personnel consultant Bob Jolly and a Mensa colleague, computer programmer Jeff Whittle (who spent eight months developing the PPA program). TIMS holds an extensive copyright on the PPA system, in its various forms, and intends to produce further industrial psychology application packages in the future.

How it works

The computerised PPA system is based on 24 groups of four adjectives, giving a total of 96 words. The person being assessed types in his name and is then presented with a group of four words, and must select from these the two words that he considers most descriptive and least descriptive of himself. Once this has been done, he proceeds to the next group of four words, and so on until all 24 selections have been made.

Program operation is relatively

smooth, with only the 'M' and 'L' keys being used (to select the most and least appropriate words) along with the PC arrow keys. The left and right arrow keys shift between words, and the up and down arrow keys step back and forth between word-groups. The user can go back and change previous selections as many times as he likes until he is satisfied with all 24 of his answers.

The person is presented with a group of four words, and must select the two words that he considers most and least descriptive of himself.

When this process is complete, typically after about 10 to 15 minutes, a personal profile analysis description and graph are printed out.

The graph is divided into three different profiles. One indicates perceived ideal behavior, another indicates how subjects believe they behave under pressure, and the third profile indicates the sort of behavior most often seen by others. There is a rating on each profile for the four basic drives under each condition. (These are labelled D,I,S and C, for dominance, inducement, steadiness, and compliance).

PC advantages

TIMS claims that it has been found that the PC-based PPA system is more consistent, and often more accurate than manual systems. This is not only because of the reduction in questionnaire complexity, but because people tend to be more relaxed and more honest

when describing their personalities to a machine rather than to another human. The PC is also more effective in isolating each individual group of words, eliminating the "noise" present on a card-based system, and makes it easier to concentrate on a particular group.

Once the questionnaire has been completed and the graph and statement have been printed out, all information relating to the person surveyed is deleted from memory and disk. This is explained before a person takes a test and helps to further relax the participant — and possibly results in more candid answers. The only tangible product of the PPA test is the printout itself, and the participant always has the option of reading this first and destroying it if he violently disagrees with the assessment.

System requirements

The computerised PPA implementation was written in Microsoft compiled Basic, and is supplied on a single PC-DOS 1.10 diskette. A minimal 64K-byte PC system with a single disk drive is all that is required, along with any parallel printer. (The personal profile graph is printed using standard ASCII characters, so no special graphics capability is necessary.)

The PPA package, including documentation and training, costs \$1750 with an additional \$600 annual upgrade fee. This may at first appear a little steep, but nevertheless represents a bargain to the very specific corporate and government markets to which the PPA system has been targeted. **PC**

Personal Profile Analysis

*TIMS Software International Inc.
450 Little Collins Street,
Melbourne, Vic 3000
Tel: (03) 602 2044.*

A PORSCHE FOR THE PRICE OF A VW.

OK, so you're looking for a dot matrix printer just to get from A to B. It must be economical and easy to drive, good looking but nothing a traffic cop will take a second look at.

Fact is no one takes a second look at dot matrix printing. The nature of dot matrix printing is to be the VW of data printing.

Now all that has changed.

Now the NEC P2 and P3 Pinwriters are here.

Now you can own a dot matrix printer with the classy performance of a Porsche. *A letter quality dot matrix printer.* Fair enough, you're not about to pay for a Porsche when your primary need is filled by a VW.

You don't have to pay for a Porsche.

Amazingly new Pinwriters provide an unheard of degree of versatility for the same price as dot matrix printers that only get you from A to B.

As well as the nitty gritty of routine high speed dot matrix printing, the Pinwriter gives you a new standard of character reproduction that's almost indistinguishable from a high cost word processor.

Consider the Pinwriter's unique three mode operation. High speed mode delivers highly legible functional printing at a sizzling 180 characters a second.

High density mode delivers character quality that would beat a host of typewriters at a rate of 90 characters a second.

At a highly respectable 36 cps the Pinwriter comes closer to the Porsche class performance of word processors than anything that dots its w's as well as its i's.

By the ingenious method of double pass printing, the Pinwriter creates fully formed characters with the solid black authority of a typed letter — for those times when it's you that's talking and not your computer.

That's why the new Pinwriters have as many pins as a golf course. 18 in a special high density staggered array for maximum overlap.

The incredible versatility doesn't end there.

With a flexibility word processors can't match, the P2 and P3 give you 8 font styles and speeds at the touch of a button.

Condensed characters to 17 per inch, proportional spacing for pristine presentation.

High resolution graphics can be used to print high quality charts, illustrations, graphs, user defined character.

And what about the unique paper handling options that include a bidirectional tractor, a single page guide and a cut sheet feeder that allows you to stack paper in the printer.

The P2 has a conventional 10 inch carriage while the P3 offers a full 16 inches.

Both printers can be fitted with interface modules which allow connection to almost any computer available and are fully compatible with the IBM PC.



And when it comes to reliability — well, once you've used the NEC Pinwriters, you'll wish we made cars as well!

Test drive the new NEC Pinwriters now.

To find out more about NEC Pinwriters, phone toll free (008) 226344 (in Sydney phone 438 3544), or send the coupon below.

NEC Information Systems Australia Pty. Ltd. (Inc. N.S.W.), 99 Nicholson Street, St. Leonards, N.S.W. 2065. Telephone (02) 438 3544.

NEC

NEC Corporation,
Tokyo, Japan

TO NEC Information Systems Australia
Pty. Ltd., 99 Nicholson Street, St. Leonards,
N.S.W. 2065.

Name

Title

Company

Address

Postcode Telephone

PCW

Looking Into TEMPUS-LINK

Mainframe-based Tempus Link tries to be all things to all developers ... albeit a little slow. Ian Robinson reports.

Personal computing within the corporate environment has been identified as a key area of microcomputer growth in the 1980s, a fact which spurs on the continued development of increasingly sophisticated PC-mainframe interface packages.

The many different methods in which PC-mainframe links have been implemented in the past have had varying success. Designers with mainframe backgrounds tend to view the personal computer as simply another variant of the smart terminal, and this philosophy is often reflected in their creations. On the other hand, those with PC backgrounds often regard the mainframe as no more than a cumbersome mass storage device. Neither approach is totally satisfactory and both suffer from a certain degree of tunnel vision, which in the past has led to impractical and inflexible solutions.

The mainframe-based Tempus-Link program, marketed in Australia by Distributed Data Processing Pty Ltd, is an attempt to find a suitable middle ground between these two design philosophies. Tempus-Link is a "transparent" link between PCs and mainframes, providing an open architecture allowing PC and mainframe software developers to use a multitude of access methods and options from within their own programs.

While it may be fair to claim that Tempus-Link is functionally transparent, it is by no means operationally transparent. Certain procedures are noticeably slower than if they were performed on a standalone PC, especially when the host mainframe system becomes bogged down with users.

Structure

Tempus-Link allows any type of PC-mainframe data transfer, including standard PC-DOS calls and the COPY utility. Developed by software house Micro Tempus Inc, of Montreal, Canada, Tempus-Link consists of four major software modules — the mainframe virtual disk system, the mainframe access method, the communications module and the PC portion.

The mainframe virtual disk system manages an unlimited number of emulated PC disk drives in the mainframe's memory, with sizes varying from 32K-bytes to 15M-bytes (the maximum limit of PC-DOS, not Tempus-Link), arranged in "boxes" of up to 255 disks. The mainframe access method provides access from mainframe programs to these virtual PC disk drives, with a variety of data conversion options.

The communications module makes the entire system independent of the communications hardware used, by providing a transport system on both sides of the link. The PC portion provides the PC users with concurrent access to four (mainframe) virtual drives, as well as its own physical disk drives. Any relevant disk I/O calls from application programs or DOS commands are automatically routed to the mainframe where they are processed by the virtual disk manager.

Operation

Most of the Tempus-Link software exists on the mainframe, because the PC portion is little more than a sophisticated device driver to control the virtual disks and a collection of small utility programs,

```

.          <DIR>      6-13-84    4:52p
..         <DIR>      6-13-84    4:52p
CONFIG    SYS         19    2-03-84    4:37p
TLINDD    COM        782    2-13-84   10:16a
TLINASYN  COM       5961    2-13-84   10:16a
TLINAVAT  COM       4729    2-13-84   10:16a
TLINFORT  COM       3529    2-13-84   10:15a
TLINIRMA  COM       3529    2-13-84   10:14a
TLINPCI   COM       3481    2-13-84   10:15a
TLINPCOX  COM       3305    2-13-84   10:15a
TLCOM     COM       1439    9-29-83   10:09a
TLID      COM       3202    2-13-84   10:13a
TLUSE     COM       3234    2-13-84   10:14a
TLINQ     COM       1810    2-13-84   10:14a
TLSET     COM       3634    2-13-84   10:14a
TLOUT     COM       2182    2-13-84   10:14a
TLXLFORT  COM        965    2-13-84   10:16a
TLXLIRMA  COM        969    2-13-84   10:16a
TLXLPCOX  COM        961    2-13-84   10:17a
E78       EXE      22400   10-01-83    2:57p
INDEX     DOC        508    6-14-84    9:49a

      21 File(s)      196608 bytes free

```

C>

Figure 1: Directory showing Tempus-Link PC-DOS files.

```

C>tling
DOS ID    DISKETTE #    STATUS

D:        1
E:        --
F:        --
G:        --

```

THE HOST LIBRARY - BOXO
CONTAINS 011 VIRTUAL DISKETTES

C>

Figure 2: Tempus-Link enquiry option listing virtual drives.

as shown in the sample directory (Figure 1). For instance, the inquiry option Tling lists the virtual disk drive names (usually drives D to G), the host library (or disk box) and the number of virtual disks activated (Figure 2).

The code used in the PC portion of Tempus-Link appears to be relatively well-behaved, as it has been successfully installed on TeleVideo and Olivetti compatibles as well as on PCs. Users should have no great problems installing Tempus-Link on the various other compatibles available as long as those machines run some form of MS-DOS version 1.10 or higher, and as long as they can handle the relevant communications hardware.

The virtual disk drives are accessed in the same way as standard drives on the PC. Any DOS commands or application programs that use disk I/O will perform in the same way, except perhaps a little slower. Therefore, no retraining is necessary for operators familiar with the PC.

Tempus-Data

DDP also markets the Tempus-Data package, designed to complement Tempus-Link. This product is a modified batch and on-line subset of the 15-year-old Extracto data management system.

The three modules that comprise Tempus-Data are the batch portion (which allows database extraction, mainframe file access and virtual disk control), the on-line option (which performs the same functions immediately without having to wait for batch queues) and the PC option (which allows Tempus-Data commands to be composed on a PC screen editor.)

Tempus-Data is run in load-and-go mode, so no compiling or linking is necessary. Requests can be run interactively, submitted for immediate batch execution or pooled with other requests for deferred execution. On-line execution allows a limited number of records to be

The Industry Standard

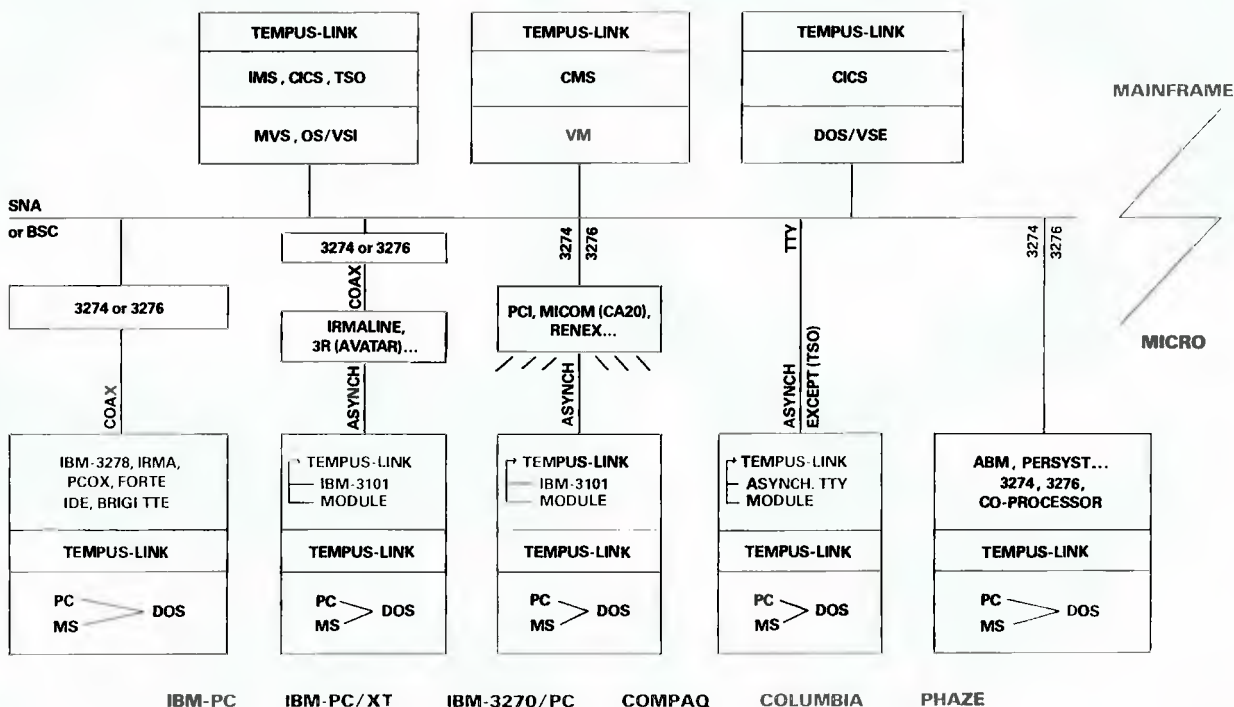


Figure 3: Tempus-Link is available in several configurations, depending on the PC and mainframe hardware.

processed (as determined by the DP management), whereas batch execution is unlimited.

Typical site

Tempus-Link was recently installed in the Melbourne office of National Mutual Life, where it is being used to interface the office IBM 3081-K mainframe to most of the company's PCs. The interface hardware used in each PC is the ubiquitous Irma board, a popular and proven favorite for this type of application. The variant of Tempus-Link National Mutual uses allows up to five PCs to communicate simultaneously with the mainframe.

Users say the only complaint they have of the system is the drop in speed for all operations involving virtual disk I/O. This contrast in speeds can sometimes become frustrating for those used to the

relative speed of the PC's physical disk drives.

(A similar situation arises when any of the popular RAM-disk packages are used. Only in this case the physical disk drives are slower).

The response time of a mainframe's operating system becomes painfully slow as the number of logged-on users rises, an annoyance that becomes most noticeable with I/O-bound products such as Tempus-Link.

Availability

Distributed Data Processing claims that Tempus-Link is the most widely used intelligent PC-mainframe link in Australia, with more than 40 corporate customers acquired since its release last November. Many others are evaluating the product.

The flexibility of Tempus-Link, its ability to function within established

corporate networks and the fact that all IBM mainframe operating systems are supported, are claimed to be the reasons for its rapid acceptance among IBM's corporate customers.

A single-user Tempus-Link system is available for a one-time charge of \$2500, and the price per user then falls by volume. (A system allowing 10 simultaneous users works out at \$1275 a user, and a 100-user system costs \$509 a user).

PC

Tempus-Link

Distributed Data Processing Pty Ltd,
Level 29, 459 Collins St,
Melbourne, Vic 3000.
Tel: (03) 62 4698.

CONFLICT AT IBM OVER PCs AND LAN STRATEGY

by IAN LITTLE

An examination of the success of the PC Group in areas outside its particular speciality (PCs) indicates that there is good market potential for devices associated with the basic personal computer. One area which has been specifically targetted by the PC Group is the development and introduction of clusters and other connection mechanisms for personal computers. This is because large numbers of PCs go into areas where it is logical that PC systems be linked together. But IBM first needs to address two major connection environments associated with the personal computer.

The first involves PCs connected to mainframes. The IBM solution is that its PC Group simply allows other groups — particularly the terminal/workstation/mainframe groups — to develop techniques and technologies which interconnect their products to other products. Classic

examples of this strategy are the 3270-PC workstation and the XT/370.

But a fundamental problem stymies this strategy. That problem is that as each group develops its own connection, the basic product provided is not necessarily related to any other products or to a global strategy.

The basis of this strategy is that each group may take the PC as a fundamental building block and may, within that context, add to, modify, or in other ways enhance the value of the basic PC. Thus, the 3270-PC and the XT/370 have essentially incompatible cards: the XT/370 will not run or emulate the 3270-PC. The products are developed and provided by two different groups. This has — depending on one's view of the marketing efforts involved — little or no impact on the PC Group itself. The group in charge of marketing either the XT/370 or the 3270-PC has, in effect, an individual product designed for a specific market. Although this product looks like a personal computer, it does not relate to any particular overall personal computer strategy.

Another ramification of this strategy is that it exacerbates a problem that has always plagued the personal computer industry: the inability of personal computer manufacturers to define the long-term PC direction. There is no reason why the 3270-PC and the XT/370 have to be "slightly incompatible". Nevertheless, they are.

The other basic connection strategy which can be practised within the PC Group is for the group to develop means to connect PCs together. The effect of this strategy is to force the PC Group to work in the LAN environment. But the LAN environment, as a number of manufacturers can attest, can be an extremely treacherous environment. Design issues proliferate ever onward, and, when one has a device

in the price range of a PC, one can encounter many problems developing rational trade-offs for PC LANs.

Thus, inside IBM, in the Entry Systems Group based in Boca Raton, several distinct factions have developed around different local area network strategies. Worse yet, the PC Group appears to be using a number of third-party PC local networks in-house. Therefore, IBM has been unable to come to grips with a single LAN for the PC — and this is in addition to its inability to come to grips with a single LAN for the overall company.

IBM has no single LAN strategy. Instead, it has concepts for open, closed/proprietary, token, and Ethernet LANs. The LAN strategy also seems to change based on retail, end-user and value added retailer/value added dealer marketing strategies. For example, the shortage of Ethernet chips from Intel is because of IBM's Series I Group, which appears to be buying up to 85 per cent of Intel's total chip production.

The PC dilemma

The PC Group faces three primary dilemmas within IBM. The first deals with the number of PCs vs. the size of the network. The second deals with the communicating vs. standalone products. The third is an issue of market demand vs. technology.

One of IBM's major strategic issues has to deal with the number of PCs vs. the size of the network. Generally, IBM tends to sell a large number of PCs into its major accounts. IBM has orders for multi-millions of dollars' worth of PCs and peripherals, and these orders involve thousands of machines. A fundamental problem IBM faces is the philosophical issue of how IBM expects those PCs to be used.

This ambiguity has fractured IBM into two major camps. The first major camp, within the PC Group,

believes that although the number of PCs bought in major orders is large, those computers will be used in small groups. The other faction feels that those computers will be used in extremely large groups. This dilemma leads to the fundamental trade-off between broadband and baseband networking technology.

The faction that believes PCs will exist in large groupings says the overall strategy should be to build a large, broadband-type trunking system between PCs so that tens of thousands of personal computers could exist on the same broadband system and connect to global service mechanisms. The other group says connections will primarily be made in small groups or "clusters" and that less expensive local service mechanisms are sufficient. To date, the first group of products announced, the PC Cluster, emphasises the cluster-type philosophy, which holds that small to medium-sized business and educational environments will dominate sales, and that additional large sales will involve a pronounced amount of clustering of the devices.

The second major dilemma is that of communities of interest and, therefore of communicating vs. standalone machines. This dilemma arises out of the question of whether or not to require that specialised software be developed for LANs: whether IBM should simply encourage the continued development of standalone software.

It is clear that for LANs to succeed there must be specialised software development, particularly in the personal computer workstation area. The issue is, therefore, whether for example, on a broadband trunking system, the user should expect to see large global services with some amount of downloading capability, or whether one should expect to see software designed specifically for some particular interest group. The initial product developed by IBM, the PC Cluster,

uses a hybrid-type strategy where, instead of fully exploiting the capability of a LAN, IBM proposes a clustering concept which could have a common library that is simply one shared volume. Each individual user could get one private volume and use a PC XT as the server.

This dilemma manifests itself in several ways. If one really believes there are going to be large

There is no reason why the 3270-PC and the XT/370 have to be "slightly incompatible". Nevertheless, they are.

communities of interest developed, one needs a sophisticated file server-type technology. The announcement of the PC Cluster indicates that IBM feels that PCs will mainly be used for some simple file sharing in most applications, and therefore the technology should be biased towards standalone-type software, with limited capabilities for file sharing in the system. Microsoft's endorsement of Macintosh, plus the proprietary software on the PC Cluster, probably means that MS-DOS is dead in the long-term because one is either going to be an IBM supplier or not.

The third PC strategy dilemma is that of technology vs. market demand. If one looks at the kinds of PC products designed for cluster-type operations, (Nestar, Novell and 3Com-type products), one sees that a major technology shift occurs in this environment. This technology shift involves the issue of a simple

file sharing-type network vs. the more sophisticated server-type technologies used by Nestar, Novell, etc.

In the particular environment in which IBM is structuring its products — based on the groups within IBM that are allowed to market the products — IBM needed an initial product that could be marketed simply. This would ideally be a retail-oriented product that could be sold in its stores, could easily be explained and sold to users, and was oriented towards small business. Thus, IBM came up with a very simple product: the PC Cluster. This type of product gives IBM the opportunity to go into a wide variety of low-cost markets, after which IBM can swap-in expensive software and other products.

Related developments

It is essential that one understands the place of PCs and PC LANs in the IBM product environment. It has been noted that the average cost to move the wiring plant for a 3278-type terminal in a large installation is \$1500 a year, which does not include an estimate of the cost to build, maintain, operate, and provide the user with that terminal in this large-scale environment. There are several environments within the IBM world in which the cost to produce a viable, large-scale 3270-type environment costs \$25,000 to \$35,000 a terminal user a year.

Now the dilemma caused by the PC becomes more complex, in that it is conceivable that the PC can run in those environments at lower costs. But the problem in providing this lower-cost resource to the user is that it is advantageous to IBM only if it can deprive such users of the ability to have quick connections to the mainframe.

IBM fears that the terminals — or the LAN-based PCs that can look like terminals — could have a disastrous impact on overall turnover

and the company has, in essence, thrown up a gate. The gate involves access to SNA-type protocols. By controlling access to SNA-type protocols, IBM can force a PC user to pay higher prices if he or she intends to connect into an SNA-type architecture.

To further complicate this situation, IBM is developing a new series of terminal-type structures based on the PC. The fact that these terminal-type structures and PCs are being developed at the same time within competing groups within the same companies inevitably leads to traumatic interactions among those various competing groups. An excellent example of this is IBM's recent announcement of software for the PC that will emulate the Displaywriter — and cause its demise. In fact, what has happened is that the present corporate situation has boiled down to a race to see who will be the first group to introduce new advanced features within PCs and terminals, and to decide who exactly is in charge of the overall corporate local network communication strategy.

Confusion?

The result of all this is that the PC Group has been left on its own to develop its LAN strategy. But its overall strategy must nonetheless co-ordinate with that of the token ring group in Raleigh, North Carolina, or the PC Group is denied access to the SNA environment.

We now see a series of extraordinary events. The first was the introduction of the PC Cluster. Although the Cluster was originally announced as a LAN product, it was characterised not as a LAN product, but a cluster product less than six weeks later. There are two main reasons for this change in emphasis. One is that the product is so deficient in terms of security, resource sharing and overall facilities that the company tried to force the

PC people to delete the name LAN. It eventually succeeded, even though the product had been announced. The PC Group also realised that by having announced its "LAN", it had quite possibly shut-off any of its future sales efforts of other LANs.

The second extraordinary event consisted of an alleged broadband product which was to have been announced in April, which was a

**So we see PCs,
work stations,
token rings and
clusters beginning to
merge as we find
that the PC dilemma
itself is raging out
of control within IBM.**

direct offshoot of Syteks' LocalNet. There were strong rumors in the industry that IBM was poised to announce a local network which used broadband trunking and was designed to handle multiple hundreds to thousands of PCs, and that this broadband product was based on Sytek technology — in particular, a 2M-bits/sec modem developed by Sytek.

But, Sytek, in playing the political game, caused two major reactions. The first event was that by leaking and trying to cause the press to rumor the announcement, Sytek caused major reverberations within IBM itself as to the political wisdom of the announcement at this particular time. Second, the manner in which the announcement of the Cluster was handled caused the people in Raleigh (involved with the

token ring development) to gain exceedingly strong political clout within IBM. Because Sytek may be experiencing delays and because there is some doubt within IBM as to Sytek's ability to deliver the modem chips, the April announcement was delayed.

The third extraordinary event concerns OEM dealers. Because marketing did not have a LAN product to sell, the National Accounts and National Marketing Divisions have been allowed great latitude in their efforts to sell products. Thus a number of agreements have been signed.

There is a value-added dealer relationship with Nestar, where Nestar has, in a sense, ad hoc approval of IBM Corp; there is a large (\$US20 million) purchase at the retail level of OmniNets from Corvus, which are then resold in a West Virginia schools contract.

There are also a substantial number of other confusing agreements and arrangements. There is an agreement for PC LAN products with 3Com and with Proteon Associates.

So we see PCs, work stations, token rings and clusters beginning to merge as we find that the PC dilemma itself is raging out of control within IBM. This has caused yet a further "sub-dilemma": are the PC people allowed to be truly independent of the rest of the company with respect to LANs? Apparently the answer is yes — in the short term.

But with the change of terminology forced onto the PC Group by the Raleigh people, the answer is starting to look more and more like a resounding no. The PC people will have to have an integrated approach.

Ian Little is managing director of Ampec Electronics Pty Ltd of Sydney, and is a consultant to the NSW government on production control systems.

PRICE CUTS DESIGNED TO REGAIN MARKET SHARE FOR PCs

IBM dealers in the US expect their sales of PCs to triple because of price cuts announced by IBM on June 7. The price cuts spanning IBM's entire product line are also expected to help dealers unload growing inventories of IBM computers that have been piling up since May.

The rise in sales do not mean a comparable increase in profits for dealers. Although dealers' profit margins remain at about 32 per cent, the price cuts result in a lower gross profit on each sale. IBM made the cuts in an effort to regain market share that has been gradually lost over the last few months, analysts said. InfoCorp, a Californian research company, estimated that the PC has declined from a 21 per cent share of retail sales in January to 16 per cent in March. That trend, which comes at a time when IBM is tripling its own PC production, is at least partly responsible for the price cuts, analysts said.

Despite the prospect of boosting

sales, dealers interviewed recently were not unanimously pleased with the price cuts. Many dealers expressed concern about eroding profits and the adverse impact the cuts will have on IBM-compatible computer brands.

Dealers were also concerned that IBM's cut would trigger a round of price-cutting by other manufacturers. That chain-reaction, coupled with growing inventories and softening seasonal demand, could cast the marketplace into a state of disarray.

MICROPRO LAUNCHES ITS LATEST SOLUTION UPDATES

MicroPro International Corp has made several additions to its ProSolution line of applications for automatic specific information management tasks, designed for use with the company's InfoStar + 1.6 information management system.

The Prospect Tracking Solution organises, documents, tracks, and reports on client or customer sales contact. In this tracking system, data entry forms capture standard

and user-defined data about prospects for reports and mailings. Also included is an electronic notebook for keeping a record of contacts, and another notebook that produces "tickler" reports, which alert the user when to contact a prospect.

Using a hard disk, up to 500 prospects can be accommodated. On floppy disk systems, 75 prospects is the recommended limit.

The system produces 12 reports, including a call schedule and prospect ranking. Users can modify the system to create additional data entry forms and reports using the capabilities available in InfoStar+ 1.6.

The Mailing List and Business Letters ProSolution lets users store business contact names and manage volume mailing projects. Up to 10,000 names and addresses on a hard disk system can be typed into a ready-made form and stored for future access, the vendor said. On a dual floppy disk system, up to 600 names can be stored.

Also included are several sample business letters, which can be merged with information in the name and address file and printed. (InfoStar+ 1.6, WordStar, and MailMerge are required to perform this function).

As well as customised form letters, the ProSolution prints envelopes and mailing labels in six formats. It will also produce directories and proof reports of selected names based on user-assigned categories and demographic information, the company claimed.

PC-DOS formats of the ProSolutions are available, and most MS-DOS formats will be available this summer. Both ProSolutions require a minimum of 96K-bytes of RAM.

Start-up training is not required, and there is no need to learn InfoStar+ before using the ProSolutions. A menu system and pre-designed input forms lead users through applications.

Vice President of New Technology, Ashton-Tate — Wayne Ratliff said:
"Although we have kept all the features of DBASE II
that have made it so popular, we rewrote DBASE III in 'C' language from the ground up
to have greater capabilities, storage, speed, power and ease of use,
and to take advantage of the power and technology of 16 bit and larger computers."

dBASETM III goes

BETTER

Features of DBASE III

1. Over 2,000,000,000 records per data base
2. 128 fields per record
3. Variable length text field up to 4K bytes per entry
4. 4,000 bytes per record
5. 10 data base files in use simultaneously
6. Fast internal sort and improved indexing
7. 16 digits of numerical accuracy
8. Enhanced reports capability
9. On line help system
10. Full screen formatting

System Requirements

1. IBM PC XT and all PC compatible computers
2. Minimum 256K bytes RAM, two 5¼" floppy disc drives
3. Monochrome or colour display, any printer with at least 80 columns
4. PC DOS 2.0 operating system

ASHTON-TATETM

distributed by **arcom** *pacific*

Contact your local dealer for more information or write to
Arcom Pacific, Freepost 2, P.O. Box 13, Clayfield Q 4011

DUMB LANS ARE "SMART" MOVE BY DEVELOPERS

While builders of local-area network hardware are still waiting for their market to take off, other manufacturers are trying to sell so-called dumb networks as a means of putting personal computing power on top of several desks in one office.

A least four companies at the recent Comdex show in Atlanta showed plug boards that turn IBM PCs into multiuser hosts that can accommodate extra users operating standard dumb terminals. For a small business looking to give everyone in the company access to the computer, these "dumb networks" could easily be the cheapest way to go.

These products may not actually deserve to be called networks at all, because they don't connect several personal computers to one another, but rather connect terminals without microprocessors, memory, or peripherals to a personal computer that acts as a host device. The boards essentially make an IBM PC or XT into the functional equivalent of a timesharing minicomputer system. The PC acts as a host

computer, running programs and handling the transfer of information between computer, disk drives, printer, and the four or more terminals connected to it at the same time.

Though the networks may be dumb, the companies selling the equipment think it's a smart move. Digital Research Inc (DRI), best known for developing the CP/M operating system, calls its plug-in board product StarLink. DRI, which until recently had very little to do with the development of hardware, says it was enticed over the line from software to hardware by the potential of the product to fill in a network gap.

The company calls StarLink a "computer expansion system," not a network. The product permits a PC owner to link four remote terminals to a single machine, "allowing each terminal to function as if it were the only terminal attached to the system," the company says.

The StarLink package includes the plug-in board with an onboard 8088 microprocessor, DRI's Concurrent PC-DOS operating system, and the StarLink software. The plug-in board comes with 64K-bytes RAM and four operating ports, which can be connected to remote terminals via RS232 cables. Indeed, users can opt to connect other microcomputers to the ports, in order to allow several computers to share the hard disk, although this is not the primary focus of the product.

One of the keys to the scheme is DRI's Concurrent PC-DOS operating system. That program lets more than one user run application programs on the PC at the same time. In fact, all four users could operate the same application at once; only one copy of the program would be needed. Each terminal can cause the host PC to read the program from the hard or floppy disk, cutting down on the cost of software as well as hardware.

IBM HOLDS EXHIBITION TO PROMOTE SCIENCE

To help promote the use of PC in the engineering, scientific, surveying and geological areas IBM plans to produce a catalogue of third-party application packages available in Australia. This catalogue will be launched at a Sydney exhibition scheduled for August 21-22 at the Forum Centre, Clarence St. IBM will extensively promote the catalogue. A similar exhibition is scheduled for Brisbane the following week.

IBM is particularly interested in promoting products that exploit the capabilities of the 8087 co-processor, as such programs are few and far between. The Intel 8087 is designed to speed up mathematical floating-point operations, and as such, is ideally suited to the scientific and engineering environments.

Local developers of application packages (software, hardware, or a combination of the two) are urged to submit details of their packages to IBM and to demonstrate these at the exhibition. Those interested can contact Bronwyn Guthrie at IBM, on Tel: (02) 234 5753, or by writing to PO Box 3318, Sydney 2001.



EVEN THE BEST LAID PLANS: By most accounts, IBM did not intend to cut prices on its PC line until around September, when a price reduction would coincide with the anticipated announcement of a new 32-bit micro. Those plans, however, appear to have gone to pieces in the same way that many of IBM's plans have crumbled recently: rumors of the price cuts began rumbling through Wall Street, rocking the already vulnerable stocks of IBM competitors, and causing IBM to act early. On June 7, **The Wall Street Journal's** "Heard on The Street" column reported that price cuts were imminent. And at 5.30 the same evening, IBM announced the price cuts over the business wire. Dealers reported they had no advance warning that the cuts would come as soon as they did. According to sources close to the company, IBM was advised by SEC lawyers to make its price adjustments public before the rumors devastated competitors' stocks . . . Ah, the problems of being Big.

IBM WINDOWS: When IBM introduced its Assistant Series of PC software last month — a move that many analysts interpreted as the first skirmish in the long-awaited IBM Software Wars — one product was reportedly missing from the series. "Glass," a windowing product under development by IBM, should have been included in the series, analysts say. According to Ken Lim, senior analyst with **Dataquest Inc.**, Glass will be comparable to **VisiCorp's** Visi On. "It will be closer to Visi On than to **Microsoft** Windows," says Lim. "Visi On requires that programs be written specifically for it, whereas Windows only requires that a program be written to MS-DOS standards. Glass will not be as universally compatible as Windows." Apparently, Glass was not ready for IBM's May announcement of the Assistant Series. Lim now expects the product to be introduced in the third quarter of this year. "IBM may lump it in with the **PCI** announcement,"

Lim said. PCI is an anticipated replacement for the IBM PC. Dataquest anticipates that PCI will be a "souped-up version of the PC" with an 8088-2 chip which runs at 8MHz rather than 4.77MHz. According to Lim, PCI appears to be a replacement of the PC rather than an additional model. Lim expects an announcement in late August, followed by shipments in early October.

ON THE LAN FRONT: Industry watchers are expecting IBM to unveil a new component in its LAN strategy within the next three months. Internally codenamed **Big Top**, the product is reportedly a file server under development in the Austin, Texas, branch of the Entry Systems Division. The file server is said to be an extremely important component in IBM's overall cabling strategy, since it will allow PCs to be linked to all IBM mainframes and minis.

IN THE INTERIM: Until it does come up with its own networking solution, however, IBM appears to be signing agreements with communications companies as often as possible. Most recently, **Ungermann-Bass Inc.** signed on to IBM's Value-Added Dealer program. Under its contract, Ungermann-Bass will add proprietary network management software and an intelligent interface to IBM's family of PC products. The resulting package will be remarketed by Ungermann-Bass to end users as part of the Net/One local area networking system.

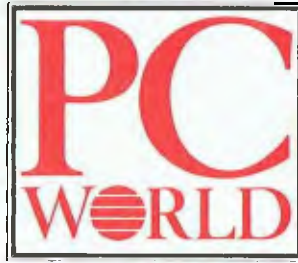
TO THE RESCUE: IBM may not quite fit the role of damsel in distress, but independent software developers are nonetheless rushing to its rescue with business software designed for the PCjr. Earlier this year, it was peripheral makers who rushed on to the scene with expansion boxes, add-on memory, and new keyboards all designed to enhance the limited natural endowments of IBM's home

computer. Now, software developers are showering their charms on PCjr in hopes of igniting some interest on the part of the business community. In Atlanta last month, dealers were treated to demonstrations of PCjr running **MicroPro's WordStar**.

Alpha Software debuted its integrated software for the PCjr called **The Electric Desk**. And **Chang Laboratories** announced (hopefully) that its Rags to Riches accounting series would be "the software that will save the PCjr". It's all a very valiant effort — particularly for a system that most observers agree was poorly conceived, poorly positioned and poorly advertised, to mention only a few drawbacks.

"BULLET": It's hot in Houston this time of year, and our guess is that the good folks at **Compaq** are sweating. Dealers are swamped with excess PCs. IBM has just announced price cuts. AT&T has a new luggable on the horizon. And, as if matters could get any worse, Compaq's new desktop system (still unannounced) is meeting with a limp reception from dealers. So far, Compaq has shown its new IBM-compatible system to several groups of dealers, as well as to select members of the press (this one not included) — and reaction has been decidedly ho-hum. Code-named **Bullet**, the system is based on the 8086 chip and reportedly has little to differentiate it from the masses of PC clones. Dealers, who are currently saddled with massive inventories of PCs and XT's, say they have declined to place orders for the new system. Meanwhile, Compaq is reported to be busy repricing Bullet in the wake of IBM's price cuts. Prices were originally set at \$US2595 for a single-disk version and \$US2995 for a dual-disk version. "Why would I want to carry a PC-compatible desktop that will compete with my PC product?" asked one true-blue dealer. "Compaq may offer a slightly better margin, but the closer I get to IBM's high-volume ordering, the happier I am."

Australian




About IBM PCs and compatibles

1984 WORLD CLASS PC AWARDS

*Australian PC World readers vote
for their favorite
IBM PC compatible products in
12 hardware and 18
software categories.*

**WIN THE WORLD CLASS PC
SOFTWARE COLLECTION
WORTH MORE THAN \$3000**



Australian PC World is proud to announce the 1984 World Class PC Awards. Readers will vote for their favorite IBM PC compatible products in 12 hardware and 18 software categories. The winning products plus an IBM PC constitute the 1984 World Class PC.

Australian PC World asks readers to help design this year's World Class PC by voting for PC compatible products in the categories listed on the contest entry form. Choose one product in each of the categories you are familiar with that you would recommend to a friend for outstanding performance and value.

The product that gains the highest number of votes in each category will receive *Australian PC World's* 1984 World Class PC Award. The reader who correctly estimates the retail value of the 1984 World Class PC software collection as at June 1, will win all of the packages in this collection. If a correct estimate is not received, the software collection will be awarded to the reader whose estimate is closest to the correct answer. In the event of a tie in value estimates, the prize will go to the entrant whose nominated list of products most closely matches the World Class PC. If a further tie occurs, the prize will be awarded on the basis of neatness.

The *Australian PC World* World Class PC Awards will be announced in the November issue of the magazine.

Several of the software

categories are defined here to help readers place their votes. The other categories are self-explanatory.

Accounting

Order processing, inventory, accounts receivable and payable, cheque writing, payroll, general ledger, management reports.

Business management

Project and appointment scheduling, statistical analysis, decision analysis, personnel records, sales prospect management.

Education

Classroom subjects, training on applications software such as word processing.

Financial applications

Investment analysis, portfolio management, stock information retrieval, financial calculation, planning, and reporting.

Operating environments

Window-oriented software systems designed to integrate any number of applications programs.

Personal management

Household record keeping, personal finances, personal data management.

Spreadsheets

Includes programs that integrate other functions, such as graphics or word processing.

Remember to vote for products that you would recommend to a friend, which means performance and value are equally important considerations. After all, you may win the system you help to create.

1984 World Class PC Entry Form

Name: _____

Address: _____

Dear Reader: Use this entry form to vote for IBM PC compatible products that **you are familiar with and would recommend to a friend for performance and value**. Choose one product per category, although it is not necessary to vote for all categories. Only commercially available, off-the-shelf products are eligible. Please print your entries and submit by August 31, 1984.

Hardware

	Manufacturer	Product	Model
Compatible Computer (second prize)	_____	_____	_____
Color Graphics Board	_____	_____	_____
Color Monitor	_____	_____	_____
Combination Board	_____	_____	_____
Disk Drives	_____	_____	_____
Hard Disk Storage (10M to 12M)	_____	_____	_____
Input Device (mouse, light pen, digitiser, touch pad, etc.)	_____	_____	_____
Modem	_____	_____	_____
Plotter	_____	_____	_____
Printer — dot-matrix	_____	_____	_____
Printer — letter quality	_____	_____	_____
Communications Board	_____	_____	_____

Software

	Manufacturer	Product
Accounting	_____	_____
Business Management	_____	_____
Communications	_____	_____
Database — index file	_____	_____
Database — major	_____	_____
Disk Emulator	_____	_____
Education	_____	_____
Financial Applications	_____	_____
Games	_____	_____
Graphics	_____	_____
Language	_____	_____
Operating Environment	_____	_____
Operating System	_____	_____
Personal Management	_____	_____
Spreadsheet	_____	_____
Terminal Emulator	_____	_____
Utilities	_____	_____
Word Processing	_____	_____

AUSTRALIAN

PC WORLD

1984 World Class PC Entry Form

**WIN
the 1984
World Class PC
Software
Collection
Question**

What is the estimated retail value of the 1984 World Class PC software collection?

\$

Send your entry form to World Class PC Awards, Computerworld Pty Ltd, Box 929, Crows Nest 2065, before August 31, 1984

The product that receives the most votes in each of the 18 software categories wins the 1984 World Class PC Award for each category. Together, these 18 award-winning products comprise the 1984 World Class PC software collection. The reader whose estimate (as at June 1, 1984), of the recommended retail value of the 1984 World Class PC software collection is most accurate wins all of the products in the collection.

Award Rules

Only one entry form per person is allowed. Entries must be written or printed by hand on the entry form that is printed in the magazine or on a reasonable facsimile of that entry form. You must include your name and address, along with your vote for IBM PC compatible products.

The 1984 World Class PC Awards will be made by the Editor of *Australian PC World* based on readers' votes in each of the 30 categories. The 1984 World Class PC software

collection will be awarded to the reader who correctly estimates the recommended retail value of the 1984 World Class PC software collection as at June 1, 1984. If no entrant correctly estimates the recommended retail value of the collection, the prize will go to the entrant who makes the closest estimate to the correct recommended value. In the event of more than one winning entry, the prize will go to the entrant who nominates the greatest number of products in the World Class PC, and to the neatest, most nearly

correct entry, in the event of a continued tie.

The 1984 World Class PC Awards will be announced in the November issue of *Australian PC World*, with the winner of the World Class PC software collection.

Entries must be received no later than August 31, 1984, and should be returned to 1984 World Class PC Awards, Computerworld Pty Ltd, Box 929, Crows Nest, NSW 2065.

Employees of Computerworld Pty Ltd are not eligible to enter. Thank you and good luck.

DEALER PROFILE

Realising the tremendous potential for a software market that would be generated in Australia by the PC and its horde of imitators, three Melbourne businessmen formed the Software Corp of Australia (SCA) soon after the official launch of the PC in February last year.

Arnold Roth, Michael Warren and Jim Landau launched SCA with the range of Alpha Software products, including Data Base Manager II and WordPerfect. They went on to pick up the exclusive distribution rights to the incredibly popular MultiMate word processing package, Columbia Computing Services' Micro-Scheduler and, more recently, Fox Research's 10-Net and 10-Base packages.

SCA is a specialty software house that provides productivity tools for businesses, Landau says. Heavy circulation of promotional material and hotline services for dealers and end-users are an integral part of SCA's product-specific image. MultiMate, for example, carries a five-year guarantee, which SCA supports by supplying updates and revisions to all registered customers. SCA also provides extensive technical support to dealers and users, culminating in the formation of the SCA training institute in Melbourne.

In an industry fraught with bankruptcies and fly-by-night operations, SCA has fought to establish its reputation and permanence. This was highlighted by the recent opening of an office in Sydney. Landau says branches in other capital cities are sure to eventuate, as are further SCA training institutes.

All SCA software products are marketed through dealers, and not to individual customers (no matter how big). SCA intends to continue this policy, even though it has missed a few larger contracts in the past because of it.

The latest SCA product to be launched is Fox Research's controversial 10-Net, considered a

'hot product' at the recent NCC convention in Las Vegas. This is an Ethernet-like network requiring no fixed disk or central file server PC to operate. The hardware required for each network PC plugs into one of the PC expansion slots (even a short slot in an XT will do), and from then the system is switch-on-and-go.

10-Net has far less of the complexities inherent in other PC networks and is totally transparent to the user. One immediately noticeable advantage is the use of inexpensive (about 40c a metre) twisted-pair cable to link network nodes, as opposed to the relatively expensive multi-wire cable used by Janet or the coaxial cable used by 3-Com Ethernet. Standard I/O calls are intercepted and checked by the network software for any 10-Net commands. Otherwise the PC behaves quite normally.

The next SCA product to be announced is known as the Electric Desk, also from Alpha Software. This package was originally developed for the PCjr and upgraded for the PC following the PCjr's rather mediocre market performance. The Electric Desk is a poor man's Symphony (perhaps they should have called it Whistle) that is claimed to integrate word processing, spreadsheet, and so on.

SCA planned to lift the lid off the Electric Desk at the PC 84 show in Melbourne. Other new SCA products released at the show include a version of MultiMate for the Texas Instruments Professional Computer (both the desktop and portable models) and a version for the touch-screen HP-150.

**SCA Software Corporation
of Australia Pty. Ltd.**
449 Swanston St,
Melbourne Vic. 3000.
Tel: (03) 347 7011.

★ PC ★ SOFTWARE

BCI specialises in commercial and vertical market SOFTWARE DEVELOPMENT & DISTRIBUTION

PRODUCTS currently available for **IBM PC, CP/M, MP/M** and some **UNIX-based** systems.

- SCHOOL ADMINISTRATION SYSTEM
- BAKERY & CATERING MANAGEMENT
- HOTEL, CLUB & RESTAURANT SYSTEMS
- MEMBERSHIP SYSTEM
- INTEGRATED ACCOUNTING SYSTEMS
- INVENTORY MANAGEMENT
- PAYROLL SYSTEM
- JOB COSTING
- ASSET REGISTER
- COMMODITY & SHARE TRADING
- MORTGAGE & LOANS MANAGEMENT

**DIRECT ALL ENQUIRIES TO:
MR M. HILL OR MR C. IRONS**



**BUSINESS
COMPUTERS
INTERNATIONAL
Pty Ltd**

184 Pier St, Perth, Western Australia 6000
Telephone: (09) 227 9133. Telex: AA94449
G.P.O. Box B70, Perth, W.A. 6001

(09) 227 9133

SYDNEY GAINS TWO NEW USERS GROUPS

The winter months traditionally see an upsurge in the amount of personal computing activity, the theory being that beaches and parks become less of an attractive proposition as the winter chill sets in, compared to central heating, a hot cup of coffee, and your favorite computer. Indeed, this theory could well explain why a great deal of user group activity seems to originate in Melbourne.

Hence, as winter finally descends upon New South Wales, it is not surprising to note the emergence of two new user groups in Sydney. The first of these is the embryonic dBase Users Group, which held its inaugural meeting at the MTE Centre on Monday July 2. (MTE stands for Management Technology Education Pty Ltd, a professional education company.) Paul Zucker, the driving force behind the new group, acted as chairman for the meeting. Also present was Les Bell, there to give a brief overview of the new dBase III package. After preliminary discussions involving future meeting times, venues, newsletters, special interest groups and fees, the chairman decided it was time to "SET BELL OFF", so to speak. Following Bell's presentation, coffee was served (courtesy of MTE) and the meeting dissolved into various informal discussions. Future meetings of the dBase Users Group were (tentatively) set at the first Tuesday of each month, and the matters of fees, venue and election of committee members were left to be decided after the first few meetings had taken place.

The other Sydney group to be launched is the Sydney PC Users Group. If the attendances at the local Lotus and dBase groups are anything to go by, there should be a good turnout to their inaugural meeting on Wednesday, July 30. The meeting is to be held at the OTC Conference Room in Martin Place, and the main speaker will be a representative of Arcom Pacific, who will describe the powerful new Concurrent PC-DOS from Digital Research. This subject should be of interest to most PC users, as

Concurrent PC-DOS is claimed to be upward compatible with both PC-DOS and CP/M-86! Other products recently released by Arcom include Ashton-Tate's dBase III and Framework packages, which may also be covered if time allows. The other subject to be aired at the inaugural meeting will be OTC's Minerva communications system, presented by Bryan Fitzpatrick.

The Adelaide user group has decided to schedule more tutorial-style activities in future meetings, as many of the newer members are first time users. The group was fortunate enough to preview a real live PCjr in their June meeting, followed by a Corona at the July meeting. The next machine to be demonstrated will be a Tandy Model 2000, at the group's August 2 meeting.

Returning to the subject of cold weather, members of the Melbourne PC user community are to be treated to a talk on printers and plotters as part of their July 18 meeting. This is to be presented by Viv Fernandez of Anderson Digital Equipment. Unfortunately, some MELB-PC members will have to miss out this talk because the group will be maintaining a stand at the PC 84 Show, opening that day at the World Trade Centre in Melbourne. As with the previous PC 84 held in Sydney, a special section is to be set aside for user group stands. On display will be sample newsletters, public domain software, and perhaps the new MELB-PC bulletin board system, which is hoped to be fully operational by then.

The theme of MELB-PC's August 15 meeting is to be "Databases — from PC/File to PC/Focus", and should be of interest to most members. Volume 1.2 of the MELB-PC newsletter has now been printed and can be obtained by writing to the group's mailing address.

PC USER GROUPS

MELB-PC

Address: 500 Bourke St,
Melbourne 3000.

Contact: Chris Leptos (03) 605 2222.
Meetings: 5.30pm third Wednesday,
Clunies-Ross House,
191 Royal Pde, Melbourne.

IBM-PC Users' Group (SA)

Address: PO Box 68,
Walkerville, SA 5081.

Contact: Don Richards (08) 261 9590.
Meetings: 7.30pm first Thursday,
173 Wakefield St,
Adelaide (or as advised in PC News).

The Illawarra IBM-PC Club

Address: PO Box 77,
Port Kembla, NSW 2505.

Contact: Ken Jeffrey (042) 74 0422.
Meetings: 7.30pm first Tuesday,
John Lysaght,
Springhill Street Training Centre.

ACT PC Users' Group

Address: PO Box E188,
Queen Victoria Tce, ACT 2600.

Contact: Nick Hammond (062) 86 1102.
Meetings: 8pm fourth Monday.
Main lecture room,
Canberra TAFE, Reid.

dBase Users Group

Address: PO Box 297,
Neutral Bay Junction, NSW 2089.

Contact: Maria Lengas,
Meetings: 6.30pm first Tuesday.
MTE Centre, 2nd Floor,
cnr York and Market Sts, Sydney.

GLOBAL EXCHANGE OF PC DISCOVERIES

STAR-DOT-STAR provides a forum for users to share their PC discoveries. Australian PC World will pay \$20 for each PC program, technique or patch published. Send them to:

*Star-Dot-Star
Australian PC World,
PO Box 929,
Crows Nest 2065.*

Using INSTR to check INPUT

Most people who write programs would like to have a fast, clean way to verify that a one-character entry in fact conforms to the choices that are offered. This is often helpful in menu choices.

The INSTR function is perfect for this use. INSTR.BAS is an example that demonstrates the versatility that INSTR allows. Lines 100 to 140 print the menu of choices. Let's suppose that the first two choices each branch directly to some line and the next two choices require a preliminary step (such as closing all

files) before branching. Line 200 calls the subroutine to get a character from the keyboard. INSTR is used in lines 210 and 230 to verify that the user has entered a valid choice and to branch to the correct line in the program. (Note that, as shown in line 230, INSTR is easily employed to find a match for either uppercase or lowercase letters.) Any other character causes the program to beep and return for another entry (lines 240 and 250).

Donald Ramsey
Houston, Texas

Screen data capture

By accident I have discovered an interesting phenomenon that does not seem to be covered in IBM's manuals and that could be useful in keyboard entry functions.

From the Basic or BasicA initialization display type
10 LINE INPUT A\$: LINE INPUT B\$: PRINT B\$

RUN this program. Enter any string of characters into A\$ during the first LINE INPUT. But instead of actually keying characters into B\$ (in the second LINE INPUT), use the cursor

controls to move the cursor up into the character string keyed for the A\$.

If you press <Enter> without actually keying in any data, you will find that the PRINT statement will display the character string that was entered in A\$—even though no characters were keyed into B\$.

I have used this phenomenon to allow correction to a string entry using the cursor controls and the <Ins> and keys.

Steven Green
University Heights, Ohio

Cross-reference checker

An easy way to check all the cross-references in a Basic program is to renumber an imaginary line beyond the end of the program. For example, if your line numbers end at 4000, type the following in direct mode:

```
RENUM 9999,9999
```

Basic checks all the line number references and issues any error messages without renumbering your program. If the only reply is 'Ok', then all your GOTOs and GOSUBs refer to existing line numbers.

Carl Wagner
Rochester, Minnesota

Faster searches

I would like to share a little trick with other WordStar users. When you request a time-consuming task like Find & replace without asking, a considerable amount of time is used to display the occurrences of the requested string. When such a display is unnecessary (because the GN option has been selected), you can save time by entering a new command just after starting the execution of the first one. The new command might be either another Find and Replace (for instance, when you are formatting tables that have been output from a Basic program) or a simple command like "Top of file" (QR).

For the incredulous reader, the

```
100 PRINT"      MAIN MENU":PRINT
110 PRINT" <1> Transaction Entry"
120 PRINT" <2> End Program"
130 PRINT" <R> Report Menu"
140 PRINT" <F> File Maintenance"

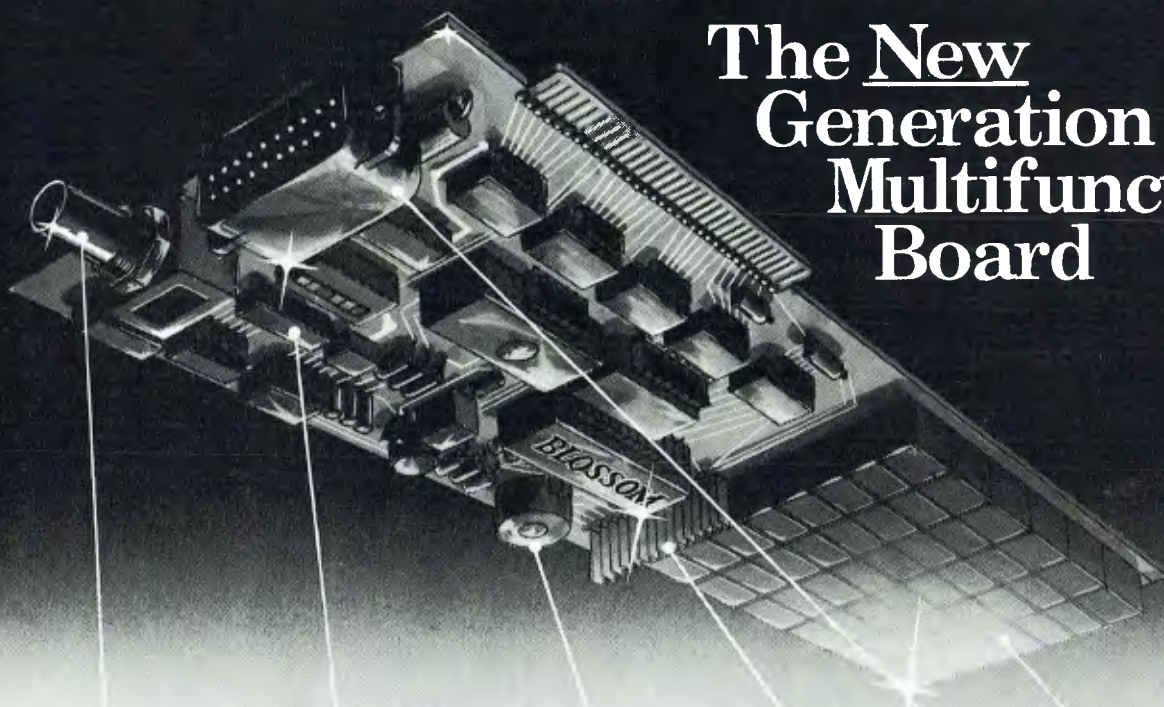
200 GOSUB 900
210 ON INSTR("12",A$) GOTO 1000,2000
220 CLOSE
230 ON INSTR("RrFf",A$)/2 GOTO 8000,9000
240 BEEP
250 GOTO 200
899 '**Get 1 character
900 A$=INPUT$(1)
910 RETURN

1000 PRINT "Line 1000":END
2000 PRINT "Line 2000":END
8000 PRINT "Line 8000":END
9000 PRINT "Line 9000":END
```

Listing 1: INSTR.BAS allows fast, tidy one-character input.

BLOSSOM™

The New Generation Multifunction Board



CLOCK
CALENDAR
WITH ALARM

PARALLEL
PORT

SERIAL
PORT

EXPANDABLE
TO
384K

NEW
PC NET
EXPANSION

NEW
DISC
CACHING

1984 • BLOSSOM
• 384K + 10 + PC net

BLOSSOM: Out of the confused multifunction world emerges the only board which will let your PC continue to expand beyond current multifunction capabilities and permit it to meet your future needs.

New from Orchid Technology, BLOSSOM uniquely meets the challenge. It has all the standard multifunction features, plus Orchid's advanced productivity software and built-in logic that

allows connection to PCnet, a low-cost local area network that has been proven in thousands of installations.

PCnet BLOSSOM™: When your future needs require networking, a simple, optional, plug-in daughter board connects you to PCnet, the leading local area network for the IBM PC and compatibles. Now you'll be able to inexpensively share hard disks,

printers, information, etc.

Telecomputing PCS invites you to buy the BLOSSOM for your needs today, and its PCnet expansion capabilities for networking tomorrow.

For more information, call Telecomputing PCS at our Sydney Office on 923 1266, or our New Zealand Agents, Skellerup Microsystems on (N.Z.) 810 460

Dealer enquiries welcome.



Telecomputing
PCS

SUITE 201
83 MOUNT ST.
NORTH SYDNEY
PH. 923 1266.
TELEX: AA23941

NEW ZEALAND AGENTS
SKELLERUP MICROSYSTEMS
124 MARSHALL ST.
WOOLSTON, CHRISTCHURCH
NEW ZEALAND
PH. (N.Z.) 810 460

PCnet, PCnet BLOSSOM and BLOSSOM are trademarks of Orchid Technology, IBM and IBM PC are trademarks of International Business Machines Corporation.

TIFF/98

simple test of replacing all instances of the letter "e" by "ee" in this text took 1 minute, 32 seconds when the display was allowed to change, but only seven seconds without the display. When you are editing long texts in which a frequent word or group of words has been replaced by a special character (~for instance) or formatting tables, this little trick can save a lot of time. Of course, the savings in time occurs for most other commands too.

P. Jeanty
New Haven, Connecticut

Keyboard suppression

These two OUT statements turn the keyboard on and off. To turn it off type

OUT 97.204.

To turn it on type

OUT 97.76.

You must have the second OUT in memory before you execute the first; otherwise the system will hang.

Marc-David Siedel
Roslyn, New York

Batch file filer

Recently, I had to keep a file of note cards that could be rapidly searched with one or more key words, or possibly a key phrase. Not wanting to pay \$200 or more for a note file program and not wanting to take a lot of time to develop my own, I turned to my new DOS 2.00 manual and found the Find filter.

Here was a ready-made program that would search a text file for a particular word or phrase and display every line in the file in which the key word/phrase appeared. This is close to what I needed, but I also wanted to be able to have several key words present in a particular line before it was displayed. A little tinkering with the batch facility produced the solution, which has proven very useful. I call it LOOKFOR. To key it in use Edlin to type in the listing reproduced in Lookfor.bat.

To search Your1.file and Your2.file for every line containing several key words enter, for example
LOOKFOR injury spinal?

After some delay, every line in

Your1.file and Your2.file that contains both words will be displayed. The batch file works by first searching the Your files for the word injury, creating a temporary file of all the lines containing that word, and then searching the temporary file for all occurrences of the word spinal. This process would continue for as many key words as were requested in the LOOKFOR command. The question mark delimits the list of key words; if you forget to put it there, everything will still work, but the message 'syntax error' will briefly appear on the screen.

Imaginative key words can ensure that you find all note references that you are interested in. For example, if I used "injur" and "spin" instead of "injury" and "spinal," I would have seen all references to spine or spinal injuries, or injured spines, etc.

```
echo off

cls

find "%1" B:your1.file B:your2.file >templ.srh
:continue
shift
if not %1 == ? goto next1
more<templ.srh
goto endsrh
:next1
find "%1" templ.srh >temp2.srh
shift
if not %1 == ? goto next2
more<temp2.srh
goto endsrh
:next2
find "%1" temp2.srh >templ.srh
goto continue
:endsrh
if exist templ.srh del templ.srh
if exist temp2.srh del temp2.srh
```

Listing 2: LOOKFOR.BAT is a multi-word search utility.

TIMSEL

(09) 386 6277

CAN'T FIND SOFTWARE
THAT SUITS YOUR NEEDS?

We can provide tailored software at less than "off the shelf" prices and offer advice on:

- Software for commerce, science and industry.
- Evaluation and selection of hardware and software systems currently available.
- Full maintenance backup and staff training.
- Upgrading of existing systems.
- Information regarding current trends.

We can also sell your computer on consignment. Why not call our experienced staff or write to:

TIMSEL COMPUTER SYSTEMS & CONSULTANCY PTY LTD.
Suite 3/204 Hampden Road,
Nedlands WA. 6009. Telephone B/H
(09) 386 6277, A/H (09) 386 1924.

Even the fastest fingers slow down when they struggle with computer commands. And no matter what software you use, you still have to enter the same things over and over again.

That's why you need SmartKey II™, the software that lets you control your computer with a single keystroke.

Add SmartKey II™ to WordStar and you can juggle margins and insert "boilerplate" paragraphs or sentences with just one key. Add it to Lotus 1-2-3 and you can concentrate on the numbers instead of the mechanics.

Don't type in the same thing twice. SmartKey II™ can remember commands, words, paragraphs, even entire letters. With SmartKey II™, you can work faster and never worry about which keys to press.

It's easy to see why thousands of people all over the world are already using SmartKey II™ to make their lives easier.

SmartKey II™ features.
Assign more than 3,000 characters to a single key.
Define over 300 function keys.
An exclusive "SuperShift" lets every key have up to four meanings.
Change any keyboard to the Dvorak layout.
Keys can be redefined while other software is running.
Key definitions can be saved to disk for later use.
SmartKey II™ is invisible to other software.
SmartKey II™ runs on the IBM PC and compatibles, the PCjr, the Kaypro II, 4, and 10; plus all other MS-DOS, CP/M and CP/M-86 based personal computers.

Best of all, SmartKey II™ is only \$69.00 plus tax. To see how SmartKey II™ can speed up your work, pick up a copy at your computer dealer. It's the smartest move you will ever make.



FBN Software,
16 Coles Place,
Torrens,
ACT 2607
(062) 861102
Dealer enquiries
welcome



A Stroke Of Genius.

SmartKey II™ is a trademark of FBN Software. WordStar is a trademark of MicroPro, Inc. Lotus 1-2-3 is a trademark of Lotus Development Corporation. CP/M is a trademark of Digital Research, Inc. MS-DOS is a trademark of Microsoft, Inc. PC-DOS is a trademark of IBM.

The ten slowest parts of your computer.




```

10 OPEN "YOUR1.FLE" AS #1 LEN = 242
20 FIELD #1,2 AS YR$, 1 AS SLASH$, 2 AS MON$,
   1 AS SPA$, 20 AS SOURCE$, 1 AS SPA2$, 20 AS
   AUTH1$, 1 AS SPA3$, 16 AS KEY1$, 1 AS SPA4$,
   15 AS KEY2$, 160 AS NOTE$, 2 AS LINEND$
30 INPUT "2-digit code";CODE%
40 IF CODE% = 99 THEN CLOSE: END
50 LINE INPUT "YEAR:";YEAR$
60 LINE INPUT "MONTH:";MONTH$
70 LINE INPUT "SOURCE:";MAG$
80 LINE INPUT "AUTHOR:";AUTHOR$
90 LINE INPUT "ADDITIONAL KEYWORD:";KEYWRD$
100 LINE INPUT "LOCATION (PAGES):";PAGE$
105 PRINT "NOTE:"
110 LINE INPUT INNOTE$
120 LSET YR$=YEAR$
130 LSET SLASH$ = "/"
140 LSET MON$ = MONTH$
150 LSET SPA$ = " "
160 LSET SOURCE$ = MAG$
170 LSET SPA2$ = " "
180 LSET AUTH1$ = AUTHOR$
190 LSET SPA3$ = " "
200 LSET KEY1$ = KEYWRD$
210 LSET SPA4$ = " "
220 LSET KEY2$ = PAGE$
230 LSET NOTE$ = INNOTE$
232 LSET LINEND$ = CHR$(13) + CHR$(10)
240 PUT #1, CODE%
250 CLS: GOTO 30

```

Listing 3: NOTEFILE.BAS creates a very simple database.

When you are using more than two key words, there will be a fair amount of disk accessing. What I do is set up my emulated disk; copy LOOKFOR, FIND, and MORE to the emulated disk; and make the emulated disk the default drive. This causes the searches to be almost instantaneous.

An efficient note file can be set up using Basic's random file mode. If you format 240 characters of information into each record you place into the file, the LOOKFOR command will display your notes in a neat format on either an 80- or 40- column screen. The actual file will be set up with a record length of 242, the last two characters containing a carriage return and line feed so that the FIND filter will view the random file as a text format and treat each record as one line in the file. The listing Notefile.bas is a simple example of how

such a file might be created.

Remember, the default buffer size using Basic is 128, so be sure to start Basic with the command

```
BASIC/S:242
```

before running this program.

Douglas Miller
Tulsa, Oklahoma

Tree root bug

Having a Tallgrass 20M-byte hard disk with over 50 subdirectories, I have come to depend on the DOS utility TREE.COM to help me control the subdirectories.

One day, to my surprise, I could no longer list any subdirectories past the first root subdirectory, Database.dir. "Oh no! My hard disk has problems,"

I said. After some swearing and sweating and several long nights and days, I had isolated the problem on the TREE.COM utility program.

The problem is: if in the root directory you have a subdirectory name that is 11 characters long, and you have another subdirectory within the same directory, TREE.COM stops looking for any other directories after reporting the subdirectories of the 11-character subdirectory.

The problem is easily fixed using DEBUG to patch Tree.com:

```

A) DEBUG TREE.COM
-E 3D4 D
-W
-Q

```

No more root bugs, so now we have a healthy TREE.COM again. TREE.COM for DOS 2.10 is the same as for DOS 2.00. (I have reported the bug and the fix to IBM.)

As an added bonus there is an undocumented DOS function call (37) used in TREE.COM. This function call determines the defined system path separator character. This separator may be defined at boot time by including the following undocumented statement in the CONFIG.SYS file:

SWITCHAR=x

where "x" is any character. For example, SWITCHAR= will yield the path separator familiar to Unix users.

You may ask, "How can an applications program determine what separator character was defined at boot time?" Now the bonus. Using partial assembler code as an example:

```

XOR DX,DX      ;clear DX
MOV AX,3700H   ;put 37H into AL
INT 21H        ;DOS call function
MOV AL,DL      ;result into AL

```

Guess what's in register AL? Right, the defined separator character.

James Morgan
Orlando, Florida.

CONCURRENT LOTUS?

Try to imagine the chaotic scene created by several dozen members of a Lotus User Group actually using Lotus at the same time! The highlight of the Sydney Lotus group's July 5 meeting was an innovative hands-on session at the MTE Centre (which has 26 PCs).

Members formed small groups and received a sheet of 10 Lotus problems to solve. The well-prepared question sheet and accompanying Lotus files were formulated beforehand by Ron Pollak and Mark Ginsburg. After the session, the various answers were compared and debated, and in several cases solutions were discovered that were better than the 'official' ones. Definitely a useful exercise for all concerned.

Following a short 'pummel the panel' session and closing remarks from president Ron Pollak, the customary hard core proceeded to drifted down to a local restaurant, this time the Towers Grill.

Adrienne Erwin, who is to become the voice on the other end of Imagineering's Lotus hotline attended. The hotline telephone number is (02) 211 4462, which may prove disadvantageous to users outside Sydney. The Lotus hotline is scheduled to begin operating after Symphony Day, July 26. Lotus launched Symphony in the US on July 2, following intensive media promotion

LOTUS USER GROUPS

Sydney

Address: GPO Box 5010
Sydney 2000.

Contact: Ron Pollak (02) 290 3655.
Meetings: MTE Centre, 2nd Floor,
cnr York St and Market St, 5.45 pm,
first Thursday of month.

Adelaide

Address: GPO Box 1969,
Adelaide 5001.

Contact: Paul Wragg (08) 223 5711.
Meetings: 173 Wakefield St,
Adelaide, 7.30pm,
first Tuesday of month.

Melbourne

Address: PO Box 4720, Spencer St,
Melbourne 3001.

Contact: Robert Taylor (03) 267 4800.
Meetings: Light Car Club,
46 Queens Rd (cnr Roy St),
5.30pm, first Tuesday of month.

Brisbane

Address: PO Box 24, North Quay,
Qld 4000.

Contact: Bill Savage (07) 221 2144.
Meetings: (Duesbury's) 30th Floor,
239 George St, Brisbane,
5.30pm, first Tuesday of month.

which included its first US television advertising campaign.

After the success of its first two meetings, the Brisbane branch of the Lotus Users Association has "... really started off with a bang", to quote branch president, Bill Savage. Duesbury's Brisbane office is now the group's permanent venue. Meetings are at 5:30 pm on the first Tuesday of the month, in line with the Adelaide and Melbourne branches.

President of the Melbourne Lotus group, Robert Taylor, presented a lengthy speech at the June 5 meeting, on the many ways his company (Wallace, McMullin & Smail) had used Lotus. The topic of the July 3 meeting was the power of Lotus graphics, which was expertly delivered by Ilana Broons and Bob Shattock. As with the other groups, Symphony was very much a talking point during the meeting's open forum.

PC

PERSONAL COMPUTING FOR ENGINEERS AND SCIENTISTS BEYOND THE CALCULATOR?

An **exhibition** hosted by IBM of independent engineering and scientific software running on the **IBM** Personal Computers.

A CHANCE TO EVALUATE NEW TOOLS FOR:

- Engineers
- Project Managers
- Geologists and Geophysicists
- Scientists
- Maintenance Supervisors

AS WELL AS PRODUCTS WITH CROSS INDUSTRY APPLICATIONS:

- Graphics and device interfaces
- Databases
- Planning and financial analysis packages

EVENT DATES: **SYDNEY:** Tuesday 21st and Wednesday 22nd August.

BRISBANE: Tuesday 28th and Wednesday 29th August.

Please call Sally Green on (02) 20 531, (Bronwyn Guthrie (02) 234 5753), for further details, quoting event number 4 — SENG — 02.

LITTLE NIFTIES FOR LOTUS USERS

The following helpful hints were provided by members of the Lotus 1-2-3 Users Association, and drafted by Don McKenzie, their Hot Tips editor. Australian PC World welcomes any reader contributions, so if you happen to have discovered a little nifty of your own, and have a burning desire to see your name up in lights, send it in.

Quick Exit to Ready Mode: When you are several levels into a multi-level command tree, it takes several quits or <Esc> s to return to the Ready mode. <Ctrl> <Scroll-Lock> will return directly to the Ready mode.

Order of Calculation: Lotus 1-2-3 uses natural calculation by processing cell formulae from top left to bottom right. If your worksheet has a cell formula which depends on another cell which is calculated after it, the correct calculation for that cell will only occur when the next series of calculations is done. This problem can be overcome by setting the iteration counter to 2, that is, /WGR12.

The Backspace Key: During range specifications, pressing the backspace key will cancel the range specification and return the cell pointer, unanchored, to the cell where the pointer was located when you began the command.

File Safety: After entering data for a new file, it is possible to accidentally hit the return key before entering the new file name when saving for the first time. If there are already worksheet files on the disk, this action will save the new file under the first name listed, deleting what was there previously. To avoid this accidental erasure you can include an empty file as the first worksheet on a disk.

Index worksheets: A handy way to document what worksheets are stored on a disk is to have a worksheet containing an index of all the other worksheets, with a description of what they contain. The index worksheet should have a zero macro so that it will be automatically loaded. Add /XM to the macro to give a choice of worksheets to retrieve.

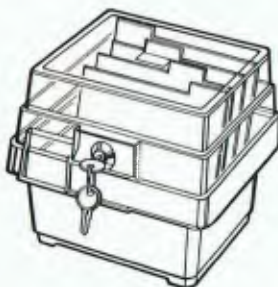
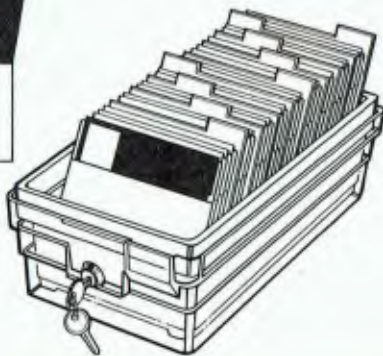
Saving printout files: When saving a printout file via /PF the file is not written to disk until the /PF command is exited, via the Quit command. Changing disks before the Quit command is invoked will corrupt your disk file.

Getting out safely: In a menu controlled worksheet, it is good practice to have your Exit Menu option include a File Save command. This helps to prevent you from making changes and then quitting without saving them.

Plotting hints: To slow down the plot speed for transparencies, select the 7470A setting instead of the 7475A setting. Some PC-compatibles may send their output to a plotter at a slow speed.

To increase this speed for paper plots, wait until the computer prompts you to select the appropriate pen, then switch the plotter off and on again. This resets the plotter to its default settings. With some computers this provides faster plotting.

THE SUPER SWEDE BOX



Professional Protection for Floppy & Mini Disks

- Lockable — Portable — Secure
- V shape for easy retrieval
- All boxes with dividers in stepped pattern for indexing system
- Self adhesive protective indexes supplied with boxes
- All dividers are height of disks eliminating need for guide cards
- Dividers have locating device which permanently locks divider in position
- Made from ABS Plastic — anti static
- International standard size to fit most suspended frame systems



SYSTEMS (AUST) PTY. LTD.

P.O. BOX 55, YERONGA. 4104
TEL. (07) 48 7227 TLX: 43219

WHAT PRICE DO YOU PLACE ON SUCCESS? \$2922? \$3540? \$4750?

No matter how you look at it, the EPSON[®] QX-10 is a lot of computer for your money.

But one look at the following computer packages will convince you that at today's recommended retail prices, you'll be getting a lot more for your money.

For \$2922* recommended retail: ☐ 192K RAM. ☐ Dual 320K disk drives. ☐ 12" 640 x 400 pixel monitor. ☐ High resolution graphics.

Or if you prefer one of the best colour monitors available on the market, then it will cost \$3540* which includes 192K RAM, dual disk drives and high resolution graphics.

Or save even more money by buying the Epson "bundled" system.

For \$4750* recommended retail: ☐ 192K RAM ☐ Dual 320K drives. ☐ 12" 640 x 400 pixel monitor. ☐ High

resolution graphics.

☐ FX-80 printer.

☐ Printer Cable. ☐ Plus

4 major software packages (Wordstar¹, Mailmerge¹, Spellstar¹, and dBase II²).

And as you would expect, hard disk is also available.

The above prices mean considerable savings on what you would normally expect to pay (particularly in the software) with a computer as powerful as the EPSON QX-10. Check it out now at an EPSON dealer and see how easily it could become part of your success story.



EPSON AUSTRALIA
The secret of success.

Epson Australia, Unit 3, 17 Rodborough Road, Frenchs Forest, NSW 452 5222.

Suite 30, 101 Wickham Terrace, Brisbane, QLD 832 5400. Level 3, 541 Blackburn Road, Waverley Square, Mount Waverley, VIC 543 6455 (from July 10).

*List price not inclusive of sales tax. ¹Wordstar, Mailmerge and Spellstar are trademarks of Micro Pro. ²dBase II is a trademark of Ashton Tate. [®]Registered trademark of Epson Corporation.

EPS-0004/R



INDUSTRY

Run for cover

NEW Zealand Insurance has put together a package that should please micro owners large and small: its "Electronicsurance" covers damage to electronic equipment up to \$75,000 per unit and computers up to \$40,000. The cover extends to damage from accident and negligence through theft, breakdown, lightning and water. Increased operating costs through any of these are also covered up to \$10,000, and the cost of re-keying all your data if lost is covered up to \$5000. When equipment is less than five years old the policy provides for replacement with new gear. **Further information:** New Zealand Insurance Co Ltd, 20 Bond St, Sydney 2000, Tel: (02) 232 0122.

Paper chase

DENMAN-CROFT Software is offering a bureau service for Australian newsagents, a mailing list bureau service and a disk copying service. The newsagents' bureau aims to computerise newsagents' paper accounts without agents having to buy computer equipment. Transaction information will be picked up, processed overnight and statements will be returned the next working day. The bureau will also provide a full customer listing on request, run list/round cards and hold stationery account details. The mailing list service is available to any organisation requiring mailing/membership/subscriber/contact lists. Up to 50,000 names can be stored on the lists, which can be tailored slightly for users' needs. The disk copying service handles disks for a wide range of computers in 8in and 5 $\frac{1}{4}$ in formats. Single copies cost \$12, more than one copy will cost \$8 each, while more than one copy of one disk will be \$8 for the first copy and \$5 for all other copies. **Further information:** Denman-Croft Software Pty Ltd, 320 St Kilda Rd, St Kilda, Vic 3182. Tel: (03) 537 2989.

Calculated risk

SOFTWARE Arts has appointed an international sales manager and opened an office in the UK to support the strong international sales of its TKISolver and VisiCalc programs. The international office, headed by Richard Sumner — a Ratcliffe maths and computer science graduate — is at 43 Buttermarket, Ipswich, Suffolk, England. Tel: (0473) 22 1551. You'll be grateful for this information in case your VisiCalculator breaks down during the holidays.

ACS alert

THE Australian Computer Society's Canberra branch is looking at the technology of local area networks, resource sharing, data communications and related topics at Lancon 84, held in Canberra from August 15 to 17. The conference on distributed computers, data processing and local area networks will also deal with sharing data, equipment, office, industrial, medical, financial and other resources, advised the ACS Lancon secretariat. ACS president Alan Coulter will open the conference, while the first paper delivered will be Dr G. Wolfendale's address on the relevance of ISO standards for LANs. **Further information:** Lancon Secretariat, PO Box 447, Fyshwick, ACT 2609. Tel: (062) 88 8048.

Hackers locked out

ASHTON-Tate will supply dBase III and Framework only on "finger-printed" Prolok disks to combat software piracy — claimed to have cost software houses some \$US360m in the United States alone last year. Communication Control, the Australian distributor of Prolok, said the special encryption technique — which adds only about \$8 to the cost of a disk — would increase software profits and ultimately bring down program prices. **Further information:** Communication Control, Level 1, 11-13 Hartill-Law Ave, Bardwell Park, NSW 2207. Telephone: (02) 597 2538.

Hard sell

MICROSOFT has appointed Software Source sole NSW distributor of its products, including a slew of new packages planned for 84/85. According to Microsoft, Software Source will be responsible for supplying dealers and independent software vendors with Microsoft products, supplying Microsoft programs on alternative disk formats to make them available to a larger range of users, and training both dealers and users on Microsoft packages. Microsoft, however, will continue to sell direct to dealers. **Further information:** Software Source, 344-348 Oxford Street, Bondi Junction, NSW 2022. Tel: (02) 389 6388.

On with the show

AUSTRALIAN Exhibition Services, organisers of the Third Personal Computer Show in Melbourne in July, note that the exhibition has been used as a launching pad for a number of new products, including the Epson PX-8 briefcase computer, the Sanyo 1100 business micro, the Sperry PC and the new Microsoft programs for Apple's Macintosh computer. Ashton-Tate and Digital Research, through their Australian master distributor Arcom Pacific, also introduced new offerings, including Framework and Concurrent CP/M-86. **Further information:** Australian Exhibition Services, Suite 3, 2 Illoua Plaza, 424 St Kilda Rd, Melbourne, Vic 3004. Telephone: (03) 267 4500.

Service contracts

ANDERSON Digital Equipment is offering engineering support through third-party maintenance contracts. The company has already contracted to carry out more than 100 PC maintenance programs, ranging from hospital and health organisations, accounting firms and small businesses. **Further information:** Anderson Digital Equipment Pty Ltd, 14 Whiteside Rd, Clayton, Vic 3168. Tel: (03) 544 3444.

PERIPHERALS

Plotting cheaper

AMPEC Electronics has released a low-cost four-pen plotter using the same software commands as some Hewlett-Packard plotters, enabling it to work with spreadsheets such as Lotus 1-2-3 without modification. The plotter is claimed to plot color graphs on any paper or overhead transparency stock up to A3 size. Alphanumerics are claimed to be drawn at a rate of five per second. Both parallel and serial interfaces are standard on the CP 40 plotter, which carries an OEM price tag of around \$200. Ampec also announced the new range of Syquest half-height fixed disk drives in capacities from 5M bytes to 38M-bytes, with \$675 to \$850 "entry level" pricing. The new Syquests will be available in September. **Further information:** Ampec Electronics Pty Ltd, 21 Bibby St, Rozelle, NSW 2046. Telephone: (02) 712 2466.

PC speedup

SUPERCHARGING your PC or XT is a plug-in option with Titan Technologies' Accelerator PC, a 10MHz 8086 co-processor board with up to 640K-bytes of high-speed RAM claimed to speed up spreadsheet and wordprocessing program execution two-and-a-half to four times. The Accelerator PC is said to be transparent to other hardware or software. It has provision for a 8087 maths co-processor chip on board. Software included consists of a print spooler and RAM disk software, plus a program that copies ROM Basic into RAM to allow high-speed interpretive Basic program development and execution. Titan also released a six-function PC board containing both a hard disk interface and a parallel printer port, apart from twin serial ports, clock/calendar and 64K-bytes to 576K-bytes of memory. A piggyback board provides for further memory upgrades. **Further information:** DataShed Communications, PO Box 517, Spit Junction, NSW 2088. Tel: (02) 960 3710.



Byte Size for Every Appetite.

Fixed and removable hard disk subsystems with 6 to 120 MB formatted capacities. And they're available now.

We satisfy a market hungry for a variety of disk subsystems.

We're Telecomputing. And we offer an appealing menu of Winchester based disks in 5¼", 3.9", & 8" sizes featuring integrated backup.

You'll find each and every disk easily integrates into your system, and our software lets you select your own choice of volume sizes.

You'll also appreciate our Quick Disc. This is an external add-on memory device for your IBM PC. Our Quick Disc delivers exceptional speed in both data access and transfer. And used in combination with a floppy or Winchester drive, it serves as a disk cache.

However, there's more to our line of

hard disks. To boost your processing speeds, our systems are designed with their own microprocessor which allows your personal computer to operate independently, therefore quicker. You'll also find a sophisticated controller that actually corrects errors without requiring host computer processing time (we knew you'd like that).

There's also a lot of reliability built in to our hard disks. In fact, we think you'll find our warranty second to none. We'll give you a 6 month warranty with optional extended coverage for up to

three years.

Our complete disk package includes backup, controller, power supply, host adapter, operating software, user friendly manual and instruction cassette, cable, cabinet, and shared-disk networking options.

It's all right here. Hard disk subsystems that are soft on your budget. A complete line of disk subsystems for your Apples, IBMs and COMPAQs that are made to order and ready to go. All you have to do is pick up the phone and let us know how many bytes you'd like.



**Santa
Clara
Systems, Inc.**

Australian Distributor:
Telecomputing PCs Pty Ltd,
Suite 201, 83 Mount St,
North Sydney (02) 923 1266. Tlx: 23941.

**See us at Stand 520
PC 84 Melbourne**

PERIPHERALS

Data encryptor

ERACOM has announced a data encryptor board designed for the PC and PC XT and suitable for many PC-compatible machines. Manufactured by Okiok Data Ltd, of Quebec, Canada, the data encryption board uses a private key encryption system based on the DES algorithm with a 56-bit key chosen by the user. Security is based on the extremely large number of possible distinct keys. Any file can be encrypted by calling up a utility program which replaces the file with its encoded image. The process can also be performed on-line. Using the board's resident module, an application program can also encrypt while transmitting to a communication line or peripheral.

Further information: Eracom Pty Ltd, 6/26 Greg Chappell Dr, Burleigh Gardens Industrial Park, Burleigh Heads, Qld 4220. Tel: (075) 56 0911.

Sytek LAN

SYTEK Inc of the US has set up a new division to develop and market a low-cost broadband LAN to personal computer and intelligent workstation OEMs. The new network will be compatible with the company's existing LocalNet/20 LAN. The new network will be designed to be cost-effective with a small number of nodes but will also have expansion capabilities to support thousands of nodes. The LAN will be available in the US by the end of the year.

Further information: Network Solutions Australia Pty Ltd, 88 Christie St, St Leonards, NSW 2065. Tel: (02) 438 3579.

Tall poppies

TALLGRASS Technologies' hard disk and cartridge backup systems are now compatible with the new Olivetti M-24 computer, as well as the Eagle IBM PC-compatible, the Panasonic JB-300 and the TeleVideo PC. The Tallgrass series of hard-disk drives offers formatted storage capacities of 12.5M-bytes, 20M-bytes, 35M-bytes and 70M-bytes, all complete with integral streaming tape cartridge backup.

Further information: Tallgrass Technologies, Suite 12, 50 Great North Rd, Five Dock, NSW 2046. Tel: (02) 712 2010.

Just imagine!

IMAGING Technology Incorporated has introduced its PCVision frame grabber, a real-time video image acquisition and display module for the PC and XT. The frame grabber includes a hardware module that plugs directly into an expansion slot in the PC, plus software driver routines, documentation and interconnecting cables. It converts standard analog video signals (RS-170) from a camera to digital data at 10MHz and stores the resulting 6-bit pixel data in an onboard 512 x 512 frame memory. The frame grabber is said to simultaneously acquire and display 30 frames per second. Two graphic overlay planes can be used for generating and positioning text or graphics anywhere on the image without disturbing the stored video data.

Further information: The Dindima Group Pty Ltd, 10 Argent Place, Ringwood, Vic 3134. Tel: (03) 873 4455.

Sharp cookie

SHARP Corporation has launched its 16-bit MZ5500 personal computer in Australia three months after its introduction in Japan, after fine-tuning the bit-mapped graphic display to allow smooth scrolling of as little as one dot at a time. In standard form with monochrome display and 256K-bytes of memory, the MZ5500 costs less than \$4000, including CP/M-86 with multi-window capability. MS-DOS will be available as an option, as will be specific graphics packages to supplement the traditional word processing, accounting and database applications. The MZ5500 can be expanded to 512K-bytes memory, color screen and up to 192K-bytes of graphics memory. A mouse is optional and makes use of the graphics facilities.

Further information: Sharp Corporation of Australia Pty Ltd, 64-72 Seville St, Fairfield, NSW 2165. Tel: (02) 728 9111.

New mate

ACI Computer Services has signed on as distributor for the range of Tecmar add-on boards and peripherals for the IBM PC and compatibles. Two ACICS staffers have gone to the US for further special training by Tecmar. One of the Tecmar cards ACICS singled out for attention is a memory board including Treasure Chest software that consists of business management tools such as clock, reminders, appointment calendars, notepads and telephone index to run in background mode for constant accessibility. Games and diagnostics utilities are included in Treasure Chest.

Further information: ACI Computer Services, 310 Ferntree Gully Rd, Notting Hill, Vic 3168. Tel: (03) 544 8433.

10-Net for PCs

SOFTWARE Corp of Australia has secured rights to distribute the 10-Net networking system in Australia. 10-Net, comprising hardware and software, is designed to link PCs in a LAN. 10-Net has an advantage of not taking over one PC as a dedicated file server, and can be installed without expensive coaxial cabling.

Further information: Software Corp of Australia, 449 Swanston St, Melbourne 3000. Telephone: (03) 347 7011.

Portable Informer

THE Peripheral People have released the PC-compatible Informer portable VDU in



Australia. The 6kg unit has a detachable IBM-compatible keyboard and an 80 col x 25 line monitor. The VDU has multi-host capability and will talk with most computer systems available in Australia. Using an SNA/SDLC, FNA/HDLC or BSC protocol, it may be switched to another host where Dec VT52/100 or ANSII 3.64 communications is acceptable. **Further information:** The Peripheral People, 19 Angus Ave, Lane Cove, NSW 2066. Tel: (02) 427 0550.

Wang printer

WANG Computer has extended its range of letter-quality daisywheel printers for the Professional Computer with the addition of the new PC-PM014. The printer offers 10, 12 and 15 pitch at 50-55 char/sec and supports Wang's library of metal and plastic printwheels. Key features of the PC-PM014 include snap-in multi-strike and fabric ribbon cartridges, paper and ribbon "out" sensors and a built-in automatic diagnostic program that identifies and reports on any problem. Priced at \$4850 with a monthly maintenance fee of \$54, the PC-PM014 has been available in Australia for about a month. **Further information:** Wang Computer, 10-14 Paul St, Milsons Point, NSW 2061. Telephone: (02) 929 5144.



PCVision frame-grabber for the PC.

SOFTWARE

High C

SOFTWARE Source has released Computer Innovations' C compiler, CI-C86, for the IBM PC running either MS-DOS or CP/M-86. Complete source code is supplied for all library functions, with the run-time package including graphics routines for the PC. Full use is claimed to be made of an 8087 numeric coprocessor, if installed, and the optimising version of the compiler is said to address up to 1M-byte of code and data.

Further information: Software Source, 344 Oxford St, Bondi Junction, NSW 2022, Telephone: (02) 389 6388.

The Word

DATA CARE has released The Word processor, a computerised version of the complete King James Bible text for use in Bible studies. The program is claimed to allow users to locate all verses containing specific words or phrases, analyse and cross-reference them and create indices for any desired topic. Text can be scrolled in either direction or randomly, and selected topics printed out for further study. The program for the IBM PC or XT is a product of Bible Research Systems USA and costs \$395. The company also announced the church information management system Adam II, written in dBase II and containing various modules from membership records to communications and cataloguing. Prices range from \$500 to \$700.

Further information: Datacare Pty Ltd, PO Box 50, Yeronga, Qld 4104, Tel: (07) 48 4382.

In the know

DATA Base Management Services, distributor of the Knowledgeman integrated spreadsheet package for the PC and XT, has released KGraph, an add-on which allows Knowledgeman users to produce high-resolution color graphics. KGraph is claimed to be able to graph data without requiring these to have been entered into the spreadsheet first, and the output can consist of bar graphs, scatter diagrams, line graphs, area plots and pie charts. The company also announced KRun, a run-time module allowing programmers to produce encrypted application programs for end-users, who will not need to buy the Knowledgeman package to run the application. DBMS is organising a Knowledgeman user group, for which Jan Smith is the contact on (03) 523 5947.

Further information: Data Base Management Services, PO Box 62, Middle Brighton, Vic 3186, Tel: (03) 523 5947.

Tandy attached

TANDY Australia has chosen Attache software to market with its Model 2000 Personal Computer and is training its consultants at 35 computer centres to demonstrate the accounting package. The company said Attache software will be available at 337 Tandy outlets throughout Australia, and negotiations were underway to sell it through the company's 7765 retail stores in the US.

Further information: Tandy Australia, 91 Kurrajong Ave, Mt Druitt, NSW 2770, Telephone: (02) 675 1222.

New dBase

IMAGINEERING has released dBase III, a new relational database management package from Ashton-Tate designed to take advantage of the processing power of the PC and XT. Ultra-fast sorting and indexing of up to 2000 million records per file, use of the color display and inter-active features such as a command assistance mode are claimed advances for the new generation dBase. The program is said to allow 128 fields per database and to be able to handle 10 database files simultaneously. Like its predecessor in the 8-bit world, dBase III has its own programming language using the same commands, but modified and enhanced for new functions. Full-screen entry, data modification and report and mailing label generation are also said to be provided. Minimum requirements on IBM or compatible machines are 256K-bytes of RAM, two 360K-bytes diskette drives and an 80-column printer. Suggested retail price is \$795.

Further information: Imagineering, 579 Harris St, Ultimo, NSW 2207, Tel: (02) 212 1411.

Quest for CAD

QUEST Automation has been appointed Australian agent for the VersaCAD computer-aided drafting package for the IBM PC and XT or compatibles, claimed to carry out 80 per cent of the jobs on a dedicated system at only 20 per cent of the price. The system is said to include a large set of graphics primitives including several types of lines, arcs, circles, ellipses, bezier curves, polygons and so on, plus powerful editing and zoom features. Automatic dimensioning and user definable grids with independent axis spacing are provided. Up to 250 levels are claimed to be capable of being stored on one drawing for overlay structures, and any part of the drawing "windowed" and independently stored. Input can be from joysticks, digitisers or keyboard and output to Hewlett-Packard or Houston Instruments pen plotters from A4 to A0 size. A Bill of Materials facility is due for release and a three-dimensional interface is said to be in the works.

Further information: Quest Automation Pty Ltd, 1 Hamilton Place, Mt Waverley, Vic 3149. Tel: (03) 277 7444.

Arcom launches

ARCOM Pacific used the 3rd Personal Computer Show in Melbourne to launch Ashton-Tate's dBase III database management software and the integrated Framework package, as well as Digital Research's Concurrent PC-DOS. Framework, for the PC and close compatibles, is said to allow users to create, analyse and manipulate words, ideas, graphs, data and numbers as easily as most spreadsheets handle numbers alone. It also contains a procedural language. Concurrent PC-DOS allows a PC or XT to run four DOS or CP/M applications programs simultaneously. It is said to offer an improved user interface, as well as data communications, windows and improved productivity tools to the PC user.

Further information: Arcom Pacific, 252 Abbotsford Rd, Mayne, Brisbane, Qld 4000. Telephone: (07) 52 9522.

File transfers

LOGO Management Information Centre has released Xeno-Copy Plus, a bi-directional disk format conversion utility operating under PC-DOS and MS-DOS claimed to allow data file transfers between machines with different operating systems and supporting more than 40 disk formats. The program, which retails at \$279, is said to allow an IBM PC or XT to read "foreign" disk files, copy them to a PC-DOS or MS-DOS disk and copy them back to the host computer. In almost all cases, says Logo, the transferred files can be used directly with the same program that generated them. Software conversion and distribution on different disk formats is handled by Xeno-Disk, also released by Logo, which is claimed to read, write, format and duplicate nearly 60 different types of 5¼in double-density formats with additional hardware. Xeno-Disk, priced at \$625, includes a utility for ASCII file filtering that helps in data file conversions. A CP/M-80 emulator utility called 80Mate and a terminal emulator, 80Term, are also available at \$179 and \$89, respectively.

Further information: Logo Management Information Centre Pty Ltd, Level 24, 100 Miller St, North Sydney 2060, Tel: (02) 929 8508.



Tandy markets Attache software with Model 2000.

SYSTEMS

Wang thesaurus

WANG has released a new software package based on the Random House Thesaurus for the Wang Professional and PIC computers. The thesaurus enables users, with a single command, to instantly access up to 60,000 synonyms indexed to 5000 key words. The package will be available on all the standard Wang office products for a one time license fee of \$230. The package needs 204K bytes of disk space.

Further information: Wang Computer, 10-14 Paul St, Milsons Point, NSW 2061. Telephone: (02) 929 5144.

Multi-user database

SOFTWARE Suppliers Pty Ltd has been appointed distributor for Optimum, the microcomputer database development system. Claimed to be designed as a true multi-user database system, Optimum operates on single user microcomputers from Dec, Wang, IBM, NCR and TI, as well as on multi-user systems like Ortel, TeleVideo, Labtam and Altos. Under Novell's Netware operating system Optimum is also said to provide true multi-user facilities on the ARCnet, Ethernet, Ommnet, proNet, PCnet and G-Net local area networks. Optimum includes a 4th generation language said to save up to 70 per cent of applications programming time compared to traditional methods. It runs from compiled code for fast operation and protection of source programs.

Further information: Software Suppliers Pty Ltd, 9 Avon Road, North Ryde NSW 2113. Tel: (02) 888 1955.

TeleVideo's Pick

DATA Peripherals has released the Pick compatible operating system called Revelation for the TeleVideo range of micros. Using relational database techniques, Revelation operates on top of MS DOS on the TeleVideo Tele PC or Tele XT family of IBM compatible microcomputers. Revelation needs a minimum configuration of 320K bytes of memory, an 8087 math co-processor chip, the MS DOS operating system and at least 320K bytes of floppy disk or a fixed disk capacity.

Further information: Data Peripherals Pty Ltd, 9 Avon Rd, Nth Ryde, NSW 2113. Telephone: (02) 888 5733.

Just for CICS

MICRO to mainframe links are getting a dime a dozen, but Oxford Software claims to have smoothed a lot of wrinkles with its peMainframe package connecting IBM PCs and compatibles to mainframes running IBM's popular CICS (Customer Information Control System) teleprocessing monitor. The system directly downloads selected records and files to a PC in automatically reformatted form for use in popular spreadsheets or other PC applications. Data created or modified on PCs can be uploaded to mainframe data files or special user libraries under system administrator control and shared among other PCs so linked to the mainframe. The package requires a PC, XT or compatible with 3278-9 terminal emulator board or asynchronous communication card or 3270 protocol converter, and CICS VS release 1.4 or higher and DOS VSE, OS VS1MVS, SSX on the mainframe. A package supporting 8 PCs costs \$9000, plus \$330 for each additional PC.

Further information: ATAC WSA Pty Ltd, 11th Floor, 41 Lavender St, Milsons Pt, NSW 2061. Tel: (02) 436 2477.

Charter training

INTERACTIVE Applications Ltd has announced a training program for dealers selling IAL's Charter series of business accounting packages. Dealers will be shown how to configure the software to best serve the client's requirements, how to instal the program and how to support it effectively. The series includes 12 modules ranging from order processing to hire purchase. The company also announced The Liberator, a program said to allow data from Charter series to be transferred to such packages as Multiplan and Lotus 1-2-3, WordStar or dBase II. The Charter modules cost \$750 each, the Liberator \$250.

Further information: Interactive Applications (Aust) Pty Ltd, 199 Pacific Highway, North Sydney, NSW 2060. Tel: (02) 920 1377.

Compact Compaq

THE Compaq Portable computer is now available in Australia. This PC compatible machine which weighs 12.7kg (single disk drive unit) comes with an 83 key keyboard and a built in 9in monochrome display. The Compaq is a 16 bit machine built around the Intel 8088 microprocessor, which has a standard 128K bytes of RAM, expandable to 640K bytes. The machine is available through Computerland Australia stores.

Further information: Computerland Australia, 13 Rodborough Rd, Frenchs Forest, NSW 2086. Tel: (02) 451 8899.

Teachers pet

THE Computer Shop advises schools that PCs and peripherals are available at substantial discounts to educational users. As an example, the "Govt. System" with 256K bytes and twin 360K byte drives, monitor, adapter and asynchronous card complete with DOS 2.0 and Basic Extension costs \$4245. It can be expanded to 512K bytes for another \$388. The basic PC with 64K bytes and one 360K byte drive costs \$2424. Software also benefits from the no tax pricing.

Further information: The Computer Shop, 74 Parramatta Rd, Annandale, NSW 2038. Tel: (02) 517 2999.

Up, up and AWA

AWA Data Terminal Group has released a new ergonomic color terminal and intelligent microprocessor workstation, the Model 8602, designed and manufactured in Australia. The 8602 incorporates a host of features, including Honeywell, Burroughs and Univac emulation. When ordered as an emulation, the 8602 comes with the required keyboard layout, interface and full operational emulation. A local processing option allows the 8602 to be operated as a complete 16 bit standalone computer running MS DOS, CP M 86 or concurrent CP M 86. A range of disk configurations is available from single or dual flexible disks offering up to 800K bytes each or a combination of flexible and hard disk providing up to 11M bytes. Flexible disk drives can directly read or write standard IBM PC disks.

Further information: AWA Engineering Products Division, 422 Lane Cove Rd, North Ryde NSW 2113. Tel: (02) 887 7111.



AWA's new Model 8602 color terminal.

NEXT MONTH



ASIAN PC COMPATIBLES

A host of new PC compatibles manufactured in South-East Asia is about to hit our shores. How will these clones alter the balance of power with existing systems, and what will be the long-term effect of this influx? Ian Robinson checks out a number of these oriental offerings and reports his findings.



PC-NET

Multifunction boards are a dime a dozen — but the new Blossom includes a PC-Net interface! It also sports the usual clock/calendar, parallel port — plus 384K-bytes of RAM. Ian Robinson looks at the net results.



MICROSOFT WORD and MOUSE

Microsoft Word is the first software to make extensive use of the Microsoft Mouse. Les Stein gives the little rodent a run for its money and reports on both products.



GETTING STARTED — INTRODUCTION TO SPREADSHEETS

Much has been said and written about PC spreadsheets, but do you really *understand* what they are all about? Harry Miller reveals the fundamentals of spreadsheet programs — and throws in a few helpful hints for budding spreadsheet builders.

Australian PC World welcomes contributions from PC users. We are particularly interested in applications, PC-to-mainframe linkages and users' experience with popular software packages. Contributions should be submitted double spaced to: Australian PC World, Computerworld Pty Ltd, 37 Alexander Street, Crows Nest, NSW 2065. Tel: (02) 439 5133.

AD INDEX

ABA Systems (Australia)	113	Data Peripherals	88	Nec Information Systems	
Arcom Pacific	100	Dick Smith Electronics	7	Australia	92
BS Microcomp	13	Distributed Data Processing	2	Pantek Australia	36
Business Computers International	105	Epson (Aust)	17, 73, 114	Parity Computer Services	Inside front, 1
Case Communications	46	FBN Software	110	Sperry Computer Systems	22
		Hospital Computers	77	Tallgrass Technologies Australia	Outside back
		IBM	112	Telecomputing	108, 116, Inside back
		Imagineering	5, 41	Timsel Computer Systems	109
		Intelligence	79	Westat Associates	23
		Lintek Computer Accessories	45		

MC-P APPLICATIONS**MC-P APPLICATIONS**

IBM — PC

WHY PAY MORE

COMPARE OUR PRICES

SOFTWARE

Lotus 1-2-3	\$595
DBase II	\$595
Wordstar Propak	\$495
Knowledgeman	\$595
RBase 4000	\$475
Open Access	\$695
Quickcode	\$259
Crosstalk	\$199
pfs-file	\$125
pfs-report	\$125
flt simulator	\$65
Multimate	\$495
ATI training	
for Lotus	\$85
for DBase	\$85
Revelation (8087)	\$1200
Symphony	call
DBase III	call

HARDWARE

AST 6 pack	\$469
AST Megaplus	\$469
AST Megapack (256K)	\$585
64K chips	\$85
PC Net	call
Orchid Multifunction	
64K, S,P,Clock	
Disk cache	\$450
Floppy disk	
Tandon	\$395
Mouse	call
PCox	\$1325
IRMA	call
IRMALINE	call
Hard disk	call
IBM PC/XT	call

**Further quantity discounts for
Corporate Government Users/Dealers**

MC-P Applications
Suite 201
83 Mount Street
North Sydney
(02) 929 8468
Tlx: AA23941

All prices subject to change

Cheque, Bankcard, Cash

Delivery costs extra

***Lotus also for Dec, Wang, TI**

MC-P APPLICATIONS**MC-P APPLICATIONS****MC-P APPLICATIONS****MC-P APPLICATIONS****MC-P APPLICATIONS****MC-P APPLICATIONS****MC-P APPLICATIONS****MC-P APPLICATIONS**

In the Hard Disk Jungle Tallgrass Clears a Path



In today's hard disk jungle, Tallgrass clears a path by offering high performance, integrated mass storage solutions for the IBM® PC and compatibles, the T.I. Professional and the Columbia computers.

TALLGRASS INNOVATIVE FEATURES

MASS STORAGE SYSTEMS with formatted HardFile™ capacities of 6, 12, 20, 35 and 70 Mb, all with built-in tape backup.

CONVENIENT INTEGRAL TAPE BACKUP SYSTEM allows rapid tape "image" streaming, or incremental file-by-file backup and restore on ANSI standard inexpensive data cartridges, instead of the usual floppies, video cassettes, or low-capacity removable Winchester devices.

NETWORK READY and fully compatible with networks such as PCnet® and EtherShare™

HIGH RELIABILITY with dual directory and read-after-write verify options. A dedicated landing zone, where the read/write heads reside when the disk is idle, provides data protection during powerdowns and transportation.

NEW! TAPE BACKUP FOR IBM-XT

Tallgrass offers a streaming tape backup device to provide data security for the internal Winchester drive on your IBM-XT. If additional hard-disk storage is also required, the internal drive may be backed-up to a Tallgrass disk/tape subsystem.

FOLLOW THE TALLGRASS PATH to your local computer dealer and watch your personal computer transform into a powerful data processing system. Available from leading personal computer retailers throughout Australia.

For further information call,
Tallgrass Technologies Australia Pty Ltd,
Suite 12, Five Dock Plaza,
50 Great North Road,
Five Dock N.S.W. 2046
(02) 712 2010/712 2003



**Tallgrass
Technologies
Australia**